AGRICULTURAL PUBLICATIONS.

The following publications have been issued by the Department, and are available for distribution at prices mentioned:—

"Fruit Tree and Grape Vine Pruning," by Geo. Quinn (Horticultural Instructor); price, 2s. 6d.; posted, 2s. 8d.

"Vinegrowers' Manual," by A. Sutherland; price, 6d.; posted, 7d.

Journal of the Department of Agriculture, 1s. per annum in advance; 3d. per single copy to residents of South Australia. Other places, 2s. 6d. per annum.

Any of the following bulletins and leaflets may be obtained by sending a penny stamp for postage:—

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Stock and Dairying—	
Bloodworms	I.
Castration of Colts	XXIX.
Cocky Chaff and Straw as Feed for Stock	III.
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THE AGRICULTURAL BUREAU.—Particulars of this Organisation, of which every farmer should be a member, can be had on application to the Department.

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All communications to be addressed:

"The Editor, Journal of Agriculture, Victoria Square, Adelaide."

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R. P. BLUNDELL,

Minister of Agriculture.

POINTS FOR PRODUCERS.

The Foal and Heated Milk.

At this season of the year many mares have foals at foot, and many are at work fallowing. It is a somewhat common practice to shut the youngsters away from the mares until dinner time. The foals are then allowed to drink whilst the mares are in a heated condition. A correspondent inquires whether this practice should be allowed, and also whether the heated mare should be allowed access to water. Mr. Place (Veterinary Lecturer) says:—"It is burning the candle at both ends to work the mare and let her suckle. For her sake as well as the foal's they should run together till weaning; if this period has to be shortened on account of work the foal may suffer, but the mare will be better. When mares and foals are separated for work and come together at dinner the mares should be cooled off before they come within speaking distance of the foals, as both will be anxious to come together; this, of course, allows the mares time, but not always opportunity for a drink. Where stabling arrangements are such that they are talking to one another as soon as the mares come in then it is better to put up a temporary foal pen some little distance off. Drinking when the mare is hot is bad for the foal unless he is used to it by running with her when she is at work."

Fire.

An exceptional growth of feed has characterized this season in the majority of districts, and with the drying-off of this comes the danger of fire. The possibilities of destruction in this way render it advisable for every precaution to be taken against outbreaks. The provisions of the Bush Fires Act of 1913 are generally well known to landholders. The principal features of the Act were published in the January, 1917, issue of the *Journal*.

Bonedust: Its Adulteration with Phosphate Rock.

Bulletin No. 9 of the Department of Chemistry gives particulars of a method worked out by Mr. C. E. Chapman, F.I.C., of detecting phosphate rock in bonedust, and of estimating its quantity. Normal bonedust, Mr. Chapman points out, contains phosphoric acid equivalent to about 45 per cent. of tricalcium phosphate and from 3.5-4.0 per cent. of nitrogen. Phosphate rock contains from 50-90 per cent. of tricalcium phosphate, but contains no nitrogen. The addition of phosphate rock powder to bonedust would therefore tend to raise the amount of phosphate and lower the nitrogen content of the mixture. In European countries low-grade phosphate rocks containing 50-60 per cent. of calcium phosphate, being unsuitable for the manufacture of superphosphate, have been used for the purpose of adulterating bonedust, and, in order to mask the addition of the rock, substances rich in nitrogen, such as ground horn, ammonium sulphate, &c., have been added. It will thus be apparent that it is not a difficult matter for a manufacturer to prepare a fictitious bonedust which does not differ very materially from genuine bonedust as far as the analytical results for nitrogen and phosphoric acid are concerned. Although it would appear from the analysis of an adulterated bonedust that the buyer receives good value for his money, he is actually being defrauded, for the purchaser is sold a fertilizer which is not what it is represented to be. Further, bonedust contains, evenly distributed throughout its mass, a nitrogenous substance called ossein, which is chemically closely related to gelatin. When bonedust is mixed with moist soil the ossein soon undergoes decomposition, and substances are produced which convert the bone phosphate to a soluble condition, thereby making it available for use by plants. Ammonium sulphate, horn, &c., have not the same action upon the phosphate rock powder, and the mixture of these materials is consequently not as efficient in its fertilizing action as genuine bonedust. It is therefore necessary that the purchaser should be protected by legislation making it unlawful for bonedust containing adulterants to be sold as bonedust. Further, bonedust costs about £6 10s. per ton. Powdered phosphate rock costs about £3 10s. per ton. It is therefore obvious that bonedust can be adulterated with phosphate rock at a profit. The necessity for legislation exists, not only in the interests of the purchaser, but in those of the honest manufacturer of a genuine bonedust, who is handicapped if compelled to compete with unscrupulous sellers of an adulterated product.

Gestation Periods.

It is of the utmost importance that the breeder of stock should know not only the date of service of his animals, but also the length of the period of gestation. This has a tendency to vary. With mares it is from 307 to 365 days—*i.e.*, 10-12 months. These are extremes; the average is 335 to 345 days, or 11-11⅜ months. With cows, 242-312 days, *i.e.*, 34½-44½ weeks; average, 275-287 days, or 39-41 weeks. A cow is actually on heat the second day after calving, says Mr. Place, but the usual symptoms are not exhibited, and it passes unnoticed, so that she comes in apparently for the first time 21-28 days after calving, and returns each three-four weekly period.

Worm Nodules in Cattle.

Under the above title the Executive Committee of the Commonwealth Advisory Council of Science and Industry has issued a Bulletin containing a number of valuable reports and articles on the nodule disease of cattle, which will be of much interest to stockowners and persons connected with the meat industry. The first section of the Bulletin consists of the report of a special committee appointed by the Council which met in Sydney last year. This report deals first with the economic aspect of the question, and figures are quoted which show that the annual loss caused to the Australian meat industry by the parasite, *Onchocerca gibsoni*, which causes the worm nodules, amounts to over £500,000. This loss is due to the fact that under an agreement with the British Government the Commonwealth authorities have agreed not to allow the export of the briskets in which the nodules are commonly found, and these portions of the carcasses are removed and in the main wasted. The special committee considers that an unnecessary amount of economic loss, both directly and indirectly, is entailed by the present regulations for export, and considers that the Commonwealth Government and the British authorities should confer, so as to arrive at some practicable means whereby such waste of food may be prevented as far as possible, and so benefit both the British consumer and the Australian Commonwealth. In another article contained in the Bulletin Dr. Georgina Sweet deals with the occurrence of similar worm nodules in countries other than Australia, and shows that they are found in many localities in Southern Asia, whilst they have recently been discovered in South America, and are reported to occur also in North America. These facts are of great importance, since the present British regulations discriminate against Australian beef, and when they were framed it was thought that worm nodules were peculiar to Australia. Another powerful argument is thus provided in favor of a revision of the existing regulations for the export of meat from Australia to Britain. The method by which the cattle became infected with the nodule-forming worms is still a mystery in spite of prolonged research. Opinions differ as to whether the discovery of the means of transmission of the parasite would be likely to lead to results of economic importance, but it is obvious that until this is known any attempt at quarantining cattle or attacking the disease would be impracticable. An account is given in the last portion of the Bulletin of the most recent researches on the subject. Drs. Cleland and Dodd and Mr. McEachran, experimenting in Sydney, incline to the opinion that the disease is spread by march-flies biting the cattle. Up to the present they have not been able to prove this, but a special committee is still working on the problem with a grant from the Advisory Council. Experiments conducted in the Northern Territory were negative, but make it doubtful whether, in that locality at any rate, flying insects of any kind can be the vectors of the disease. Copies of the Bulletin, which is No. 2 of the series being issued by the Advisory Council, will be supplied post free on application to the Secretary, 314 Albert Street, East Melbourne.

Australian Butter in England: A Warning.

There is a general impression that Australian butter was not generally so good as in some previous years. There was more "fishiness" and not a little staleness, which may have resulted from the delays which took place before shipment. Many brands which had been graded as firsts in Queensland, New South Wales, and Victoria had to be relegated to lower grades on their arrival here. Fortunately the complaints made by buyers were not very loud, as the result probably of the high prices ruling. In the interest of Australian producers, however, it is to be hoped that shipping delays in the coming season will be much less marked than they have been recently. Three practically new sources of butter supply to this country have been opened up during the past 12 months—South Africa, British India, and

California; none of these is as yet of any great importance in comparison with the total consumption. The first-named country sent 731 tons during the nine months ended March 31st, 1917, and 1,114 tons during the three following months; but these latter are not shown in the Board of Trade Returns. The total from that source was therefore 1,845 tons during the 12 months ended June 30th, 1917. Its value compared very favorably with those of butter from Australia, New Zealand, and Argentina; and when it is remembered that South African makers have had no practical experience to guide them in meeting the varied requirements of this market as regards flavor, color, saltness, and method of packing, it must be recognised that their butter may ultimately, and probably soon, become a very effective competitor against the older established favorites in this market. British India shipped experimentally to the United Kingdom 112 tons during the same period and California sent 600 tons. (Twenty-third annual review of the imported dairy produce trade; Messrs W. Weddel & Co. Limited, London.)

Sheep Eating Sugar Gum Leaves.

The question as to whether at a certain stage of their development leaves of the sugar gum are poisonous to animals has been raised by the Kanmantoo Branch of the Agricultural Bureau. Two members reported the loss of sheep after they had eaten the leaves. No experiments have been conducted with the idea of determining the point, but the Veterinary Lecturer (Mr. Place) states that clinical records tend to prove that the leaves of the sugar gum do generate a glucoside or similar poison when they are taken on an empty stomach.

Odds and Ends of the Wool Clip.

In reply to a question as to the difference in value of a skin that had been bled and one that had not, Mr. Henshaw Jackson (Wool Instructor, School of Mines) said the difference would be that between a first and second class pelt. As to whether it paid better to shear a dead sheep than to skin it, he stated that the skin of a dead sheep, flayed after a period of perhaps days between death and finding of the carcass, would probably be to some extent decomposed, and would not tan into a good basil. If the wool had "set" again upon the skin, it would on the whole be best to skin the sheep. The matter of the handling of the rams' and hoggetts' wool was also made the subject of questions. Mr. Jackson stated that rams' wool was not considered to be equal in spinning capacity to that from ewes and wethers. It was also fatty, clammy, and harder to scour than other sorts. When there was sufficient hoggetts' wool to make a bale, it was advisable to pack it separately. Rams' wool should be put in a bag by itself—a procedure that was also recommended in the case of the long-woolled fleeces. They could be enclosed in a bale with the other wool, but care should be taken to see that the broker was advised as to the number on the bale containing them. It was preferable in all cases to take off the bellies, even if they were good.

INQUIRY DEPARTMENT.

Any questions relating to methods of agriculture, horticulture, viticulture, dairying, &c., diseases of stock and poultry, insect and fungoid pests, the export of produce, and similar subjects, will be referred to the Government experts, and replies will be published in these pages for the benefit of producers generally. The name and address of the inquirer must accompany each question. Inquiries received from the question-boxes established by Branches of the Agricultural Bureau will be similarly dealt with. All correspondence should be addressed to "The Editor, *The Journal of Agriculture,* Adelaide."

[Extraordinary pressure on space has rendered it necessary to very considerably curtail the inquiry department. Replies to those questions of more general interest only have been published; however, every query received has been replied to through the post.—Ed.]

VETERINARY INQUIRIES.

''A. R.,''Talia, West Coast, reports a mare with swellings about udder.

Reply—The swellings described are lymphatic in nature, and will yield to fomentations, and a teaspoon of saltpetre twice a day for 10 days or so, or better to use powders that veterinary surgeons compound especially for such cases. They would also act as a preventive, and there is no reason why she should not be put to horse this season.

''M. A. P.,'' Edillilie, has a mare with swelling on neck.

Reply—The swelling is a fistulous wither which can only be cured by surgical treatment frequently described in these replies. The dressing for sore shoulders keeps them supple while healing. Once the hair follicles are destroyed no remedy can restore the color to the hair, staining is the only way of darkening it. For full details see articles and replies on the subject in previous numbers of the *Agricultural Journal.* The fit of a collar should lie comfortably where neck and shoulder meet, it should be large enough to admit three fingers to run between it and the skin when in position, and at the bottom the hand should pass freely between it and the windpipe. It should be thoroughly beaten up once a week.

''A. D.,'' Keith, has a cow off feed, constipated, lost milk, breathing rapid.

Reply—The symptoms point to her having caught a chill with congestion of the liver following. Keep her warm and give warm bran mashes, if necessary drench her with a few quarts of oatmeal gruel. Give her 15 drops tr. nux vomica morning and evening till better.

''J. W. L.,'' Hornsdale, has mare with lips swollen, blue, and irritable.

Reply—The symptoms point to a condition known as purpura hæmorrhagiea, probably a slight attack. Give a teaspoonful of saltpetre in a little bran twice a day for a few days, and wash the lips with soap and warm water occasionally.

''W.H.A.,'' Saddleworth, has a calf, dull and listless, with puffy swelling under throat.

Reply—Probably the foramen ovale, a valve in the foetal heart, which should close at birth, has failed to completely do so. This will probably occur in a few more weeks; in the meantime give five drops tr. digitalis each evening, and five drops tr. nux vomica each morning for a few weeks. Some of the weeds mentioned may at times aggravate the symptoms.

''W. A. F.,'' Salt Creek, seeks advice for rearing a foal by hand.

Reply—The addition of one-third water to cow's milk with a pinch of sugar of milk in each feed will enable the foals to digest better; when it is a few weeks old a little boiled linseed may be gradually added to the milk, and it may have bran and crushed oats to nibble.

"E. S. W.," Lameroo, has a foal, three weeks old, stiff in legs.

Reply—Probably a mild form of joint evil. Give five drops tr. arsenicum twice a day, and rub the legs with liniment. If swellings occur treat as described in *Agricultural Journal* for joint evil, the cost of such treatment nowadays is likely to exceed value of foal. If this letter had been signed it could have been replied to on October 27th.

"R. Bros.," Koppio, have horses which walk on heels out on grass with abnormal clover growth.

Reply—The symptoms point to subacute laminitis, which not infrequently appears in enzootic form on account of unaccustomed food. Ten drops aconite twice daily and dressing the hoofs with Stockholm tar would probably modify the trouble. If they come in they should be fed mostly on bran for a week or so.

"J. H.," Arwakurra, has a cow stiff in hind leg, with lumpy swelling; also swelling on front breast; snores.

Reply—The symptoms point to tuberculosis, and it would be advisable to destroy the cow. Such cases should be reported to the Chief Inspector of Stock, and kept away from other cattle pending his instructions.

"A. J. P.," Mount Bryan, has a cow with the udder injured by horn; swelling along belly; milk stringy, clotted, and bloody, but improving; lump in front of udder.

Reply—Mammitis set in as a result of the injury, and the swelling is lymphatic, as Nature tries to remove the harmful substances. The lump is a gland, which may suppurate; if it does point it should be lanced. Arnicated oil 1 to 20 with sweet oil, well rubbed in twice daily, will probably put things right.

"E. R.," Forest Range, has a heifer, two years, stiff behind after service; got down, unable to rise, picks up dry sticks, &c.

Reply—The symptoms point to that form of diet deficiency paralysis often called dry bible. It would be well to give the heifer a packet of dry yeast once daily in a gallon of milk, also to rub her loins well with liniment and let her have 20 drops tr. nux vomica three times a day. Treatment will have to be continued till better.

A member of the Port Broughton Agricultural Bureau has a cow with horn growing into its eye.

Reply—The only satisfactory way of dehorning such a cow will be to saw the horn off close to the skull, this will leave a hollow (sinus) which will have to be plugged with tow and tar.

"G. A. R.," Wandearah, has draught horses, aged, with cracked and greasy legs; fly-blown.

Reply—The condition most probably arises from the action of microscopical parasites, known as chorioptic acarides. Treatment—Clip off long hair and dress each evening with petrol 1 part, olive oil 5 parts; also give a tablespoon of sulphur in feed each evening for a fortnight. For the fly-blown one dress with petrol only to get maggots out, and dust on equal parts of slaked lime and sulphur.

A RISK.

A correspondent from Yorke Peninsula announces that he intends running his calves and two-year-olds on a scrub block on which strychnine baits have been laid for foxes. He desires to have a "supply of medicine handy in case of trouble." The Veterinary Lecturer, in reply, says that in the event of animals picking up a bait, cure is very doubtful. They must first be made sick with 20 or 30 grains of sulphate of zinc or a grain of apomorphine. This last must be injected hypodermically. Then ½oz. chloral hydrate in ½pt. of warm water should be given (the drug nowadays is about as valuable as a two-year-old), followed by ½pt. to 1pt. of castor oil.

AGRICULTURAL EXPERIMENTS.—REPORT FOR YEAR 1916-1917.

(By W. J. Spafford, Superintendent of Experimental Work.)

MOORAK.

[Conducted by Mr. A. A. Kilsby.]

In 1915 arrangements were made with Mr. A. A. Kilsby to conduct experiments in conjunction with us, on his farm, which is situated about three miles south-east of Mount Gambier. These plots have mainly to do with tests with potatoes, but as it is bad husbandry to grow the one crop continuously year after year on the same land, the block of land set aside for experimental purposes is divided into two fields, each of about 5 acres in area, which will carry a crop of potatoes in alternate years. As soon as the potato crop is removed from the land, rape is sown as a forage crop, and this is fed down close in time to prepare the land for variety tests with oats.

Each block has now carried one crop of potatoes, part of which consist of comparisons of varieties, whilst the remainder is taken up with manurial tests.

The Season 1916-1917.

The planting of potatoes started with the "early" varieties on August 17th, but a start was made to prepare the land at the end of June, when the whole block was skim-ploughed.

Between the skim-ploughing and planting a little over 5in. of rain fell, and put the land in good condition for cultivating previous to planting. After the sets were in, good rains fell, but the general conditions remained very cold until well into September. September as a whole was rather dry and very windy towards the end of the month, so that the advantages to the crop from the good falls early in their growth were more than counteracted by the dryness of September. Plenty of rain fell for the remainder of the time that the crop was in the ground.

The following table gives in detail the rain recorded at Mount Gambier since these plots were started:—

Rainfall Distribution—Mount Gambier, 1916-1917.

	1915. Inches.	1916. Inches.	Means. 1915-1916. Inches.
January	1.02	1.67	1.34
February	0.18	0.71	0.44
March	1.11	0.35	0.73

Rainfall Distribution—Mount Gambier, 1916-1917—continued.

	1915. Inches.	1916. Inches.	Means. 1915-1916. Inches.
April	1.57	2.66	2.11
May	3.51	1.53	2.52
June	7.92	6.31	7.11
July	4.84	3.67	4.25
August	5.33	4.89	5.11
September	4.89	1.83	3.36
October	2.33	3.09	2.71
November	1.15	3.12	2.13
December	0.04	2.00	1.02
Totals	33.89	31.83	32.86

VARIETY TESTS WITH POTATOES.

This season 13 varieties of potatoes were grown without fertilisers, but with 10cwts. of lime to the acre, and all varieties—except Snowflakes, which were planted on October 24th—were planted between August 17th and 25th. The potatoes were planted by hand in rows 27in. apart, 30in. being allowed between sets. The returns obtained were as follows:—

Variety Tests with Potatoes—Moorak, 1916.

Variety.	Yield per Acre. Tons	 cwts.	 lbs.
Snowflake	8	13	89
Coronation Blue	8	4	90
Pinkeyes	6	17	41
Scottish Triumph	4	15	93
Early Manistee	4	3	78
Redskin	3	11	23
Bismark	3	10	43
Beauty of Hebron	3	10	13
Up-to-Date	3	1	22
Brownell's Superior	2	16	93
Excelsior	2	15	108
Sussex Red	1	0	0
Carmen	0	16	35

These varieties take just about the same positions as far as yield goes for the past two years, so the following table showing the means for these seasons will prove of some interest:—

Yields of Potato Varieties—Moorak, 1915-1916.

	1915.			1916.			Means. 1915-16.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Snowflake	3	14	108	8	13	89	6	4	42
Coronation Blue	4	3	67	8	4	90	6	4	22
Pinkeyes	4	2	71	6	17	41	5	10	0
Scottish Triumph	4	16	37	4	15	93	4	16	9
Redskin	4	2	0	3	11	23	3	16	67
Early Manistee	3	8	10	4	3	78	3	15	100
Up-to-Date	3	17	76	3	1	32	3	9	49
Beauty of Hebron	3	4	0	3	10	13	3	7	6

Yields of Potato Varieties—Moorak 1915-1916—continued.

	1915.			1916.			Means. 1915-16.		
	T.	C.	L.	T.	C.	L.	T.	C.	L.
Excelsior	3	9	58	2	15	108	3	2	82
Brownell's Superior	3	0	5	2	16	93	2	18	49
Carmen	2	3	5	0	16	35	1	9	76
Sussex Red	1	18	41	1	0	0	1	9	20
Bismark		—		3	10	43		—	
Peach Bloom	2	18	41		—			—	
Average of varieties	3	9	14	4	2	100	3	16	109
Yearly rainfall	33.89in.			31.83.in			32.86in.		

Growth of Varieties.

During the growing period of these varieties Mr. E. S. Alcock, who attends to experimental plots conducted by farmers in the South-East, visited these plots frequently, and he reports on their growth as follows:—The early growth of all varieties was good, especially the Coronation Blue, Early Manistee, and Scottish Triumph. The later growth was short, but healthy. During December Irish Blight appeared in the foliage and stems of all varieties, which necessitated two sprayings with Burgundy mixture during this month. These sprayings checked the spread of the disease. The Carmen and Sussex Red varieties made very poor growth, and really were hardly worth digging.

The following brief descriptions of the varieties are Mr. Alcock's, from two years' observations of them:—

Snowflake.—Very late, hardy, growth is strong, healthy, and prostrate, with foliage abundant and of a light-green color, excellent croppers, good keepers, producing large-sized irregular-shaped tubers with white skins. The main variety of potato in Mount Gambier district.

Coronation Blue.—Midseason, hardy, good strong growers, excellent croppers, good keepers, producing smooth-skinned oval tubers of a bluish color.

Pinkeyes.—Early, strong, vigorous growth, excellent croppers, producing round tubers with white skins and very deep eyes of a pinkish color. Largely grown in Mount Gambier district for early crops.

Scottish Triumph.—Midseason, hardy, growth strong and vigorous, excellent croppers, good keepers, producing tubers of excellent regular shape, average size, white skins, and shallow eyes.

Redskin.—Midseason, hardy, strong grower, good cropper, good keeper, producing round tubers of average size, and with red skin.

Early Manistee.—Very early, hardy, excellent croppers, good keepers, producing smooth, flat, oval-shaped (like water-worn stones) tubers of a brown color and with shallow eyes.

Up-to-Date.—Midseason, fairly hardy, good growth, fair croppers, good keepers, producing good average-sized tubers with white skins.

Beauty of Hebron.—Late, strong, vigorous and erect growth, fair keepers, producing large tubers, light-skinned with a pinkish or bluish tinge.

Excelsior.—Midseason, hardy, fair growth, with foliage of a light-green color, fair croppers, good keepers, producing tubers with red skins, somewhat similar to "Redskin," but lighter in color and with much deeper eyes.

Brownell's Superior.—Rather early midseason, hardy, robust growth, good keepers, producing good average-sized tubers with dark reddish skins, resembling "Redskin" in shape and color.

Carmen No. 2.—Early, poor growth, poor croppers, producing regular-shaped, even-sized tubers with white skins.

Sussex Red.—Midseason, fair growth, good keepers, producing round tubers of a light-red color resembling Excelsior.

Bismark.—Very early, hardy, strong growth, excellent croppers, producing long, large tubers, having white skins with purple blotches.

MANURIAL TESTS WITH POTATOES.

The land carrying the manurial tests was prepared at the same time as that for varieties, and in the same manner. Snowflake potatoes were used in all plots, and they were planted in the latter end of October, the manures in all cases, except plot 10, being put in the same furrow as the sets. The lime and gypsum were broadcasted in all cases where used after the seed was planted. In the rows the sets were planted by hand about 30in. apart. Below will be found the results of these manurial plots for the past two years, with the average for that period:—

Manurial Tests with Potatoes—Moorak, 1915-1916.

(Snowflakes used each season.)

Plot.	Manuring per Acre.	1915.			1916.			Means 1915-1916.		
		T.	C.	L.	T.	C.	L.	T.	C.	L.
1.	1cwt. sulphate of potash	3	1	65	7	12	65	5	7	9
2.	1½cwts. sulphate of potash	3	5	10	7	9	107	5	7	58
3.	2cwts. sulphate of potash	3	10	34	7	19	111	5	15	16
4.	5cwts. basic slag, 1cwt. sulphate of potash	3	12	47	7	18	101	5	15	74
5.	5cwts. superphosphate, 1cwt. sulphate of potash	3	9	35	6	16	89	5	3	6
6.	5cwts. super., 1cwt. sulphate of potash, 2cwts nitrate of soda .	3	7	52	8	5	31	5	16	41
7.	6cwts. lime, 1cwt. sulphate of potash	3	14	49	8	18	91	6	6	70
8.	No manure	3	12	7	7	8	71	5	10	39
9.	6cwts. lime, 5cwts. superphosphate .	3	12	46	9	0	11	6	6	28

Manurial Tests with Potatoes—Moorak, 1915-1916.—continued.

Plot.	Manuring per Acre.	1915.			1916.			Means 1915-1916.		
		T.	C.	L.	T.	C.	L.	T.	C.	L.
10.	6cwts. lime, 5cwts. superphosphate (super. drilled in on the surface)	3	13	45	7	17	105	5	15	75
11.	6cwts. gypsum, 5cwts. basic slag ..	3	15	53	8	7	6	6	1	29
12.	6cwts. gypsum, 5cwts. basic slag, 2cwts. sulphate of ammonia ..	3	3	61	7	2	86	5	3	17

The results shown above, being only for two years, are not sufficient to give much chance of a correct interpretation of the behaviour of the various manurings, but as far as they go two points are very clearly brought out, viz.:—(1) that the Mount Gambier volcanic soils are very fertile soils and suitable for potato crops in their natural state, and (2) that applications of lime considerably increase the yield of potatoes.

Spacing of Potatoes Experiment—Moorak, 1916.

In the same field as the above variety and fertiliser tests were conducted, a set of experiments dealing with the spacing of potato sets was conducted on a small scale. In these tests Scottish Triumph variety was used, and the plots consisted of single rows, one chain in length.

Spacing of Sets.	Total Tubers. lbs.	Marketable Tubers. lbs.	Marketable Tubers. Percentage.
12in. apart	98	66	67.3
16in. apart	70	45	64.3
20in. apart	76	52	68.4
24in. apart	70	44	62.9
28in. apart	50	30	60.0
32in. apart	58	38	65.5

INTRODUCTION OF WEEDS.

OTHER STATES A SOURCE OF DANGER.

[By H. W. Andrew, Botanical Assistant and Quarantine Officer for Plants, South Australia.]

"When the millenium arrives all seeds for New South Wales will be detained at the Customs House, and not issued until an official seed testing station (of which we shall have many) pronounces the seed to be innocuous. In the Bible we read of the man who sowed his neighbor's land with tares at night; in New South Wales we can do such things at noonday, and, what is more, be handsomely paid for it. The way in which seeds actually injurious are introduced or distributed in New South Wales is wrong, emphatically wrong. A good portion of my time is taken up in warning farmers in regard to weed pests which they send to me, and many of them are directly traced to imperfectly cleaned agricultural and horticultural seeds.''

The preceding statement was originally made by Mr. J. H. Maiden, the Government Botanist of New South Wales, in December, 1907, and republished in the *Agricultural Gazette* of New South Wales, in April, 1916. Since 1907 something has been done along the lines indicated by Mr. Maiden, seed testing stations having been established under the Commonwealth Quarantine and Commerce Acts in each State, while Victoria and Queensland have each passed State legislation controlling the sale of seed intended for sowing purposes; and a Bill for an Act has been prepared in New South Wales. In the same period the Agricultural Departments of Ireland, Canada, and more recently the United States of America, &c., have legislated to secure more effective seed control.

Since the outbreak of the war, increased attention has been given this matter in Great Britain—the question of pure seed (freedom from weed seed impurities, &c.), and good germination capacity of agricultural seed being regarded as important factors promoting the advancement of agriculture and horticulture. In Australia each State, acting for the Commonwealth Quarantine and Customs Departments, has considerable powers in respect to controlling the importation of impure and non-germinable commercial seed from abroad. In South Australia, however, producers are placed at a serious disadvantage compared to those in States which exercise control over seeds sold within the State. The following are some of these disadvantages under which the grazier, the farmer, and the gardener are working here:—

Although a strict supervision exists in respect to seeds coming into the State from abroad, with a view to restricting the importation of weed seeds, &c., ''its control stops with the shore.'' Commercial seeds once examined and passed into the hands of the importer may be kept for years, or mixed with seed from any State or country. Finally, it may be introduced as one thing and sold as another. A serious anomaly also exists in that while commercial seeds imported from abroad are examined, there is no control whatever over the large quantities of agricultural, vegetable, and other seeds imported from the other States. This is more remarkable, as the various States have a large number of bad weeds not yet known to be established in South Australia, also a number of weeds which occur rarely here, but are widely distributed over one or more of the adjoining States. Appended are lists of these two classes of weeds found in Victoria and New South Wales, together with comments on their character, &c.

The urgent necessity for the examination of agricultural seed coming from over the border exists not because of any supposed wilful culpability on the part of the reputable seedsmen here. Seedsmen and importers in this State, as is generally the case in other countries, welcome seed inspection efforts, because of the increased assurance given to the public that seed sold has passed the standard. As tending to illustrate this point, some importers of oversea goods, on being apprised of the nature of the impurities in certain dirty consignments, have destroyed lots of seed, although they had the option of cleaning them. Further, the reputable seedsman does not knowingly import commercial seed containing seeds of bad weeds. The trouble is, however, that the importer does not always know the weed seeds contained —especially is this the case with the weeds it is most desirable to exclude, viz., those new to the State. The seedsman is seldom, if ever, in a position to recognize these, as a comprehensive collection of foreign weed seeds and other equipment, besides special experience, is required. It happens, therefore, that we are being continually exposed to the danger of importing and distributing throughout this State seed intended for sowing which may contain seeds of weeds absolutely new to South Australia. When it is realized that one consignment of dirty seed from another State may be distributed to scores—if not hundreds—of people in various parts of South Australia, it is not surprising that weeds gain a footing over the country in an almost incredibly short time.

Seeds of many of the weeds established in the adjoining States are well known to occur commonly in commercial seed.

It is unquestionably a curious anomaly that while this department is putting forward its best endeavors to keep out weed pests from abroad, the door is kept open for the same and other pests *via* the other States.

This department, acting for the Commonwealth Government, has already destroyed several consignments from oversea containing seeds of weeds established in Victoria, and has cleaned a number of other lots common to New South Wales and Victoria. It would be dangerous to assume weed pests widely distributed over both the States of New South Wales and Victoria would not find a congenial home in one or more parts of this State.

Out of nine weed pests proclaimed under the Federal Quarantine Act, which have been recorded as found in this State since 1909 (including three burrs, two poisonous plants, and two semi-parasites), seven were recorded at that time to be generally or widely distributed over Victoria, another being established at Broadmeadows, in Victoria, only. Yet another of these plants, found at Renmark, but reputed to have been destroyed, is *Xanthium orientale L.*=*X. canadense* (Mill), so closely resembling the plant known as *Xanthium Strumarium* (the Noogoora burr of New South Wales), that one botanist at least considers the two forms represent one and the same species, so it is possible that even in this case we have an introduction from another State. If we proceed at the same rate, it is only a matter of a few years and we shall have the majority of other weeds so far confined to the other States. It is not only a question of keeping out weeds new to the State, which would be covered by a system of State seed control; another important feature of the work would be the protection of the farmer and the gardener individually, who do not wish to have to cope with a crop of weeds as a result of sowing dirty seed.

It is becoming rapidly recognised more and more that any attempts at eradicating weeds must be augmented by an effective examination of seed supplies. The efforts of district councils, municipalities, or other authorities responsible, are bound to be stultified more or less so long as a continual source of spread in the shape of impure seed is possible.

It is the recognition of this fact which has been largely responsible for the seed control legislation in various parts of the world brought into force in recent years. In addition to the general laws of the Dominion of Canada, Dominion of New Zealand, and the Commonwealth of Australia, &c., we find the efforts of the local and other authorities at weed eradication augmented in most instances by State or provincial laws prohibiting or restricting the sale of seeds containing the proclaimed noxious weeds. Apart from being party to distributing our own weeds to various parts of the State as impurities in locally produced seed, we make possible and encourage the indiscriminate spread of certain noxious weeds established to a much greater extent in Victoria and other States. Still worse, so lax is our vigilance, we actually allow the seeds of weeds proclaimed noxious by the Commonwealth or the other States to be purchased and imported under their true name. Thus seeds of *Lycium horridum,* one of the boxthorns, proclaimed for the whole State of Victoria, have been specially imported into this State, examined at this office, and released to the consignee, because there exists no power to prohibit. Again, *Conium maculatum* (poison hemlock), also proclaimed for the whole State of Victoria and under the Federal Quarantine Act, if not imported, is still being planted in a number of gardens in the State and allowed to spread. These and other anomalies could be easily corrected by carefully framed legislation modelled more or less along the lines of that existing in Queensland, Victoria, and other countries dealing with the importation and sale of seed. The passing of laws in other States setting up standards for seeds intended for sale may be reasonably expected to result in the sending of an ever-increasing number of inferior supplies to those States not having similar laws.

A study of the appended tables will show certain alien weeds (56) occurring in New South Wales or Victoria, so far unknown in South Australia, and certain alien weeds (32) more or less widely distributed in Victoria or New South Wales, but recorded from only one or few localities in South Australia.

Many of these weeds are cosmopolitan and have become so chiefly because of some objectionable feature, such as (*a*) their fondness for cultivated land, resulting in the harvesting of their seeds with cultivated crops, leading to their dispersal as seed impurities; (*b*) adaptability to various soil and climatic conditions; (*c*) possession of adhesive fruits or seeds, burrs, &c.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA NOT YET FOUND AND RECORDED IN SOUTH AUSTRALIA.

Botanical Name.	Common Names.	Original Home.	Remarks.
AMARANTACEAE—			
Alternanthera achyrantha, R. Br., var. *echinata*	Khaki Weed	Trop. America	A bad weed of N.S.W.
Amarantus Blitum, L.	Wild Blitum	S. Eur., W. As., and N. Amer.	A weed of cultivated and waste places, Vic. and N.S.W.
A. paniculatus, L.	Panicled Amaranth	N. Amer.	A weed of cultivated and waste places, Vic. and N.S.W.
BORAGINACEAE—			
Alkanna lutea, *D. C.*, var. *parviflora*	Yellow Alkanna	Eur.	A weed, Vic.
Amsinckia echinata	—	Calif.	A bad weed, N.S.W.
A. intermedia	—	Calif.	A bad weed, N.S.W.
CAROPHYLLACEAE.—			
Lychnis dioica, L., var. *alba*. (*L. vespertina*, Sibth.)	White Campion	Eur. and N. Amer.	A weed, Vic.
Lychnis Githago, L.	Corn Cockle	Eur., As., and Af.	A weed in cornfields, seeds poisonous, Vic. and N.S.W. Quar. Act.*
Cerastium quaternellum, Fenzl	Fenzl's Mouse-ear Chickweed	Eur. and Amer.	A weed, Vic.
Spergula pentandra, L.	Five-stamened Spurry	Eur., As., and Af.	A weed of cornfields, &c., Vic.
CHENOPODIACEAE—			
Chenopodium Bonus Henricus, L.	Good King Henry	Eur.	A weed with a perennial root stock, Vic.
C. vulvaria, L.	Stinking Goosefoot	Eur. and N. Asia	A weed of cultivated and waste places, Vic.
COMPOSITAE—			
Anthemis arvensis, L.	Corn Chamomile	Eur. and As.	A pest in cornfields, Vic. Quar. Act.*
Arctium Lappa, L.	Burdock	Eur.	A pest in cultivated ground, Vic. Quar Act.*
Berkheya (Stobaea) rigida, Thunb.	African Thistle	S. Af.	A troublesome weed, Vic.
Carduus crispus, L.	Crisped Thistle	Eur., As., and Af.	A weed, Vic. Quar Act.*
Centaurea Picris, L.	Hard-heads	Caspian region	A weed, Vic.
Crepis foetida, L.	Fetid Hawk's beard	Eur. and As.	A bad weed, Vic.
C. taraxacifolia, Thuill	Beaked or Dandelion Crepis	Eur.	A troublesome weed, Vic.
C. tectorum, L.	Tall Crepis	Eur. and As.	A troublesome weed, Vic.

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* Proclaimed weed pests.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA NOT YET FOUND AND RECORDED IN SOUTH AUSTRALIA.—*continued.*

Botanical Name.	Common Names.	Original Home.	Remarks.
COMPOSITAE—*continued.*			
Gnaphalium candidissimum, Lam.	White Cudweed	S. Af.	A weed, Vic.
Madia sativa, Mol.	Pitchweed	Amer.	A troublesome weed, two shires in Vic.* Quar. Act.*
Matricaria discoidea, D. C.	Rounded Chamomile	As. and N. Amer.	A weed, Vic. Quar. Act.*
Scolymus hispanicus, L.	Golden Thistle	Medit. region	A weed, Vic.
S. maculatus	—	Medit. region	A weed, N.S.W.
Senecio Jacobea, L.	Ragwort	Eur. and As.	Seven shires in Vic.* Quar. Act.*
Soliva sessilis, Ruiz and Pav.	Stalkless Soliva	Amer.	A weed, Vic.
Tagetes glandulifera	Stinking Roger	S. Amer.	A weed, N.S.W. Quar. Act.*
Xanthium strumarium, L.	Noogoora Burr, Cockle or Ditch Burr	Eur., N. As., and N. Afr.	Sixty-eight or more districts in N.S.W.* Quar. Act.*
CRUCIFERAE—			
Camelina sativa, Crantz. (*C. dentata*, Pers)	Gold of Pleasure or Common Cameline	Eur. and Temp. As.	A weed, Vic. and N.S.W. Quar. Act.*
Erysimum repandum, L.	Treacle Mustard	Eur.	A weed, one shire in Vic.* Quar. Act.*
Lepidium campestre, R. Br.	Field Cress	Eur.	A weed, Vic. Quar. Act.*
GRAMINEAE—			
Agropyrum repens, L.	English Couch or Quitch Grass.	Temp. region	A bad weed in cultivated ground, Vic.
GUTTIFERAE OR HYPERICACEAE—			
Hypericum androsaemum, L.	The Tutsan *	Eur. and As.	A weed, Vic. Quar. Act.*
IRIDACEAE—			
Sisyrinchium Bermudianum, L.	Bermuda Pig-root	Amer.	Weed injurious to stock, Vic. and N.S.W.
S. micranthum, L.	Scour Weed	Amer.	Weed injurious to stock, Vic. and N.S.W.
LABIATAE—			
Moluccella laevis, L.	Molucca Balm	W. As.	A weed, Vic. and N.S.W.
Salvia pratensis, L.	Meadow Sage	Eur. and As.	A weed, Vic. and N.S.W.
S. sclarea, L.	Common Clary	Eur., As., and Af.	A weed, Vic.

* Proclaimed weed pests.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA NOT YET FOUND AND RECORDED IN SOUTH AUSTRALIA.—*continued.*

Botanical Name.	Common Names.	Original Home.	Remarks.
MALVACEAE—			
Malva rotundifolia, L.	Dwarf Mallow	Eur., As., and Af.	A weed, Vic. and N.S.W. Quar. Act.*
M. sylvestris L.	Tall Mallow	Eur., As., and Af.	A weed, Vic. and N.S.W.
M. verticellata, L.	Whorled Mallow	Eur., As., and Af.	A weed, Vic.
OXALIDACEAE—			
Oxalis tetraphylla, Cav.	Four-leaved Wood-sorrel	N. Amer.	A troublesome pest, Vic. Quar. Act.*
PAPAVERACEAE—			
Argemone mexicana, L.	Binniguy Thistle, Devil's Fig, Prickly Poppy, &c.	Amer.	A poisonous and troublesome weed, Vic. and N.S.W. Quar. Act,* and 24 districts, N.S.W.*
POLYGONACEAE—			
Polygonum Persicaria, L.	Persicaria	Eur., As., and Af.	A weed, Vic. Quar. Act. *
PRIMULACEAE—			
Lysimachia vulgaris, L.	Loosestrife	Eur. and As.	A weed, Vic.
RANUNCULACEAE—			
Ranunculus arvensis, L.	Corn Buttercup	Eur. and As.	A weed, Vic.
R. repens, L.	Creeping Crowfoot	Eur. and As.	A weed, Vic.
R. scleratus, L	Celery-leaved Ranunculus	N. Temp. region	A weed, Vic. and N.S.W. Quar. Act.*
SCROPHULARIACEAE—			
Verbascum Blattaria, L.	Spurious Mullein	Eur., W. As., and N. Af.	A troublesome weed, Vic. and N.S.W.
Veronica agrestis, L.	Procumbent Speedwell	Eur., As., and Af.	A weed, Vic.
V. Buxbaumi, Ten.	Buxbaum's Speedwell	Eur., As., and Af.	A weed, Vic.
SOLANACEAE—			
Solanum triflorum, Nutt.	Cut-leaved Nightshade	N. Amer.	A weed, N.S.W.
UMBELLIFERAE—			
Ammi majus, L.	Bullwort or Bishop's Weed	Eur., As, and N. Af.	A weed of cultivated and waste places, Vic. and N.S.W.
Bupleurum rotundifolium, L.	Hare's ear	Eur., As., and W. Af.	A weed, N.S.W.
URTICACEAE—			
Urtica dioica, L.	Tall Nettle	Eur., W. As., N. Af.	A weed, N.S.W. and Vic.

* Proclaimed weed pests.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA FOUND IN ONLY ONE OR FEW LOCALITIES IN SOUTH AUSTRALIA.

Botanical Name.	Common Name.	Original Home.	Distribution in South Australia.	Remarks.
AMARANTACEAE—				
Amarantus albus, L.	Tumble Weed, White Amaranth	N. Amer.	Paradise, Fulham. Recorded since 1909.	A weed of cultivated and waste places, Vic. Fedl. Quar. Act.*
A. retroflexus, L.	Pigweed	—	Magill	A weed of cultivated and waste places, Vic. Proclaimed under the Fedl. Quar. Act.*
BORAGINACEAE—				
Amsinckia angustifolia, Lehm.	Narrow-leaved Amsinckia	Chili	Grange Rly.	A pest on cultivated ground in Victoria, Fedl. Quar. Act.*
CAROPHYLLACEAE—				
Silene Cucubalus, Wibel.	Bladder Campion	—	Mount Lofty Ranges, North Park Lands, Mount Gambier	A perennial weed with deep running root stocks. Found in Vic., Fedl. Quar. Act.*
COMPOSITAE—				
Ambrosia artemisifolia, L.	Ragweed	N. Amer.	Mount Barker (exterminated ?)	Fedl. Quar. Act ; Canada*
Anthemis Cotula, L.	Stinking Mayweed or Fetid Chamomile	Eur., N. Af., and Asia	Adelaide Plains	Proclaimed Fedl. Quar. Act and two shires of Vic., *also found in N.S.W.
A. nobilis, L.	Common Chamomile	Eur.	Mount Lofty Ranges	A pest in cornfields and waste places in Vic.
Chrysanthemum Leucanthemum	Ox-eye Daisy	Eur., Asia, Africa	Mount Lofty and Norton Summit	Fedl. Quar. Act, also in Canada and U.S.A.*
Cirsium arvense, Scop. (*Carduus arvensis*, L.)	Creeping Thistle, Canada Thistle, California Thistle, Perennial Thistle	Eur., Asia, Africa	Nr. Mount Gambier	A perennial thistle, N.S.W. and Vic. Proclaimed for whole State of Vic. and S. Aus. Fedl. Quar. Act., also Canada *
Erigeron canadensis, L.	Canadian Fleabane	Amer.	Lower River Murray. Recorded since 1909	A weed in N.S.W. and Vic.
Galinsoga parviflora, Cav.	Small-flowered Galinsoga	S. Amer.	Waterfall Gully	N.S.W. and Vic. Proclaimed under the Fedl. Quar. Act*
Onopordon Acanthium, L.	Scotch Thistle	Eur., N. Af., and W. Asia	Horsnell's Gully, Military Rd. nr. Glenelg, nr. Port Lincoln	Proclaimed for whole State of Vic., also Fedl. Quar. Act ;* also found in N.S.W.

* Signifies that plants are proclaimed pests.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA FOUND IN ONLY ONE OR FEW LOCALITIES IN SOUTH AUSTRALIA—*continued.*

Botanical Name.	Common Name.	Original Home.	Distribution in South Australia.	Remarks.
CONVOLVULACEAE—				
Convolvulus arvensis, L.	Lesser Bindweed, Convolvulus Weed	Eur., Asia, Af.	Widely spread, but not plentiful	Proclaimed for State of Vic. and under Fedl. Quar. Act.* A poisonous pest in gardens and among crops.
Cuscuta Epithymum, Murray	European Dodder	Eur., Asia, Af.	Rare	Parasite on lucerne, &c. Proclaimed for State of Vic. and Fedl. Quar. Act*
CRUCIFERAE—				
Raphanus Raphanistrum, L.	Wild Raddish or Jointed Charlock	Eur., As., and Af.	Kingscote, cultivated land nr. Adelaide	A troublesome weed in cultivated ground, Vic. and N.S.W. Proclaimed Fedl. Quar. Act, Can. and U.S.A.*
Senebiera Coronopus, Poir.	Swine's Cress	Eur., As., and Af.	Mount Gambier	A weed, Vic. Proclaimed Fedl. Quar. Act*
EUPHORBIACEAE—				
Euphorbia helioscopia, L.	Sun Spurge	Eur., As., and Af.	Port Lincoln	A weed, N.S.W. Proclaimed Fedl. Quar. Act*
E. Lathyris, L.	Caper Spurge	S. Eur., As.	Nr. Delamere	A weed, Vic. and N.S.W. Proclaimed for S.A.*
GRAMINEAE—				
Cenchrus tribuloides, L.	Hedgehog or Burr Grass.	N. Amer.	Renmark, recorded since 1909	An injurious grass, Vic. Proclaimed (instead of ***E. terracina***) Quar. Act*
GUTTIFERAE—				
Hypericum perforatum, L.	St. John's Wort, St. John's Blood, &c.	Temp. Eur and As.	Mount Lofty Ranges	Proclaimed for State of Vic. and under Quar. Act*
PAPAVERACEAE—				
Glaucium flavum, Crantz (*G. Luteum*, Scop.)	Horned Poppy	Eur. and Med. region	Port Vincent	A weed, Vic.
PHYTOLACCACEAE—				
Phytolacca octandra, L.	Red Ink Plant, &c.	Amer.	Blackwood. Recorded since 1909 (exterminated ?)	A weed, Vic. Proclaimed for several districts in N.S.W.*
POLEMONIACEAE—				
Gilia squarrosa, Hook et Arn.	Californian Stinkweed, Digger's Weed, Sheep's Weed	Nth.-W. Amer.	South-East	Proclaimed Fedl. Quar. Act and for State of Vic.,* also found in N.S.W.

* Signifies that plants are proclaimed pests.

SOME ALIEN WEEDS OF NEW SOUTH WALES AND VICTORIA FOUND IN ONLY ONE OR FEW LOCALITIES IN SOUTH AUSTRALIA—*continued.*

Botanical Name.	Common Name.	Original Home.	Distribution in South Australia.	Remarks.
POLYGONACEAE— *Polygonum Convolvulus*, L.	Black Bindweed	Nth. Temp. Hemisphere	Nr. River Torrens......	Troublesome pest in cultivated ground in Vic. and N.S.W. Fedl. Quar. Act*
RESEDACEAE— *Reseda luteola*, L.	The Weld or Wild Mignonette	Eur., As., and Af. ..	Tantanoola. Recorded since 1909	A dye plant, but a weed when wild, Vic. Proclaimed under Fedl. Quar. Act*
RUBIACEAE— *Galium Aparine*, L.	Cleavers or Goosegrass ..	Temp. Nth. Hemisphere and Sth. Hemisphere	Few isolated patches....	A weed in Vic. and N.S.W. Fedl. Quar. Act*
SCROPHULARIACEAE— *Bartsia viscosa*, L.	Sticky Bartsia	Eur. and Med. region	Myponga..............	Proclaimed Fedl. Quar. Act.* Injurious to pastures, Vic.
B. trixago, L.	Trixago Bartsia	Eur. and Af.	Greenhill Road	Proclaimed Fedl. Quar. Act.* Injurious to pastures, Vic.
SOLANACEAE— *Solanum cinereum*, R. Br.	Narrawa Burr	—	Burnside and Melrose ..	Proclaimed for several districts in N.S.W.*
Solanum rostratum, Dun. (*S. heterandrum*, Pursh.)	Buffalo Burr, Pincushion Nightshade	Nth. Amer.	Ninnes District Council. Recorded since 1909	Proclaimed Fedl. Quar. Act*
UMBELLIFERAE— *Conium maculatum*, L.	Poison Hemlock, Carrot Fern, &c.	Eur. and W. Asia ..	South-East, Kapunda, Althorpe Is., River Torrens, suburban gardens	Proclaimed Fedl. Quar. Act, and for the whole State of Vic.,* also found in N.S.W.
VERBENACEAE— *Verbena bonariensis*..........	Vervain, Purple Top, Blue Top, Blue Weed, Wild Verbena, Mother Gunther, Cobbler's Pig, etc.,	S. Amer.	Mount Lofty Range ..	A weed N.S.W. and Vic.

* Signifies that plants are proclaimed pests.

HERB PRODUCTION.

POSSIBILITIES OF PROFIT FROM SMALL AREAS IN SOUTH AUSTRALIA.

The Horticultural Instructor (Mr. Geo. Quinn) at the request of the Advisory Board of Agriculture has supplied the following report on the possibilities of establishing herb-growing on a commercial basis in South Australia:—At the outset it was deemed desirable to ascertain the possibilities of the local market for absorbing the product if raised, and to this end local wholesale merchants and the Collector of Customs have been approached for the necessary data bearing thereon. To the courtesy of these gentlemen I am indebted for the figures quoted herein.

Herbs are broadly divided into culinary and medicinal types. The former are generally used after a simple process of preparation, such as drying the leaves or seeds which usually contain the active principle peculiar to the plant, and then rubbing them through fine sieves prior to placing the product upon the market.

The medicinal herbs appear to contain their active principles in more varied parts of the plants, and these qualities are, I understand, extracted chiefly by processes of distillation or by infusion in solvents such as alcohol.

Importation of Dried Herbs.

The Collector of Customs has intimated that owing to the imports of medicinal herbs being classed along with medicines no separate data is available, but of the culinary types he has kindly supplied me with figures of the South Australian importations for the years 1913 and 1914. During the first-named period the total reached 18,588lb. or approximately 8¼ tons, with an average value of 3.20d. per lb., and in the latter the imports fell to 12,682lb. with an average invoiced value of 3.89d. per lb. It may be assumed that the figures for 1913 represent the maximum reached in pre-war times, and that those for 1914 only indicate a decline which doubtlessly has continued in proportion to the increase of shipping and other difficulties arising from the conflict now waging, which is affecting production and export most seriously in the principal centres from which we drew our supplies, viz., France, the United Kingdom, and Austria, whose contributions were in percentages of the total 70, 15.72, and 13.75 respectively. Contrary to what is often thought, Germany contributed .05 per cent. only of this class of our imports. In regard, however, to the medicinal herbs and their products used by our druggists, importers state that the territories of our present enemies contributed the major portion of their supplies prior to the outbreak of war.

Returning to this State's consumption of the more commonplace culinary herbs, I find, per favor of the wholesale distributing merchants, that approximately a total of 17,000lb., or, say, 7½ tons of dried thyme, sage, mint, marjoram, and parsley are sent out annually to their customers. When these figures are compared with the 1913 import totals of 18,588lb. it would appear that nearly the whole of these warehoused supplies must have been imported in pre-war days.

Taking the average invoiced value of these importations and adding 4d. per lb. Customs duty, which I am informed is imposed by the Commonwealth tariff, the local grower must be prepared to produce and place his herbs on the market for not more than an average price of 7.20d. (7¼d.) per lb. in the dry condition. This may seem, when examined superficially, a tempting proposition, but when the moisture has been dried out sufficiently to prevent decomposition, probably only 1lb. of the marketable commodity will be obtained from screening through a fine sieve what originally represented 12lb. to 20lb. of the fresh shoots as cut from the growing plants. This, however, may not seem so disappointing when one is reminded that half of the total quantities quoted above are represented by the most prolific and easily grown herb, thyme.

Assuming that the full quantities imported in 1913, when supplemented by the small additional local production, would have been somewhat equivalent to 20,000lbs. dry weight used annually in the State, the possible production of this quantity at a liberal estimate of 1lb. dry to 12lb. green produce means 240,000lbs. of shoots. With the plants set 1ft. apart in rows 2ft. apart, 21,780 plants could be set out on an acre of land. Assuming an average yield of 1lb. green shoots per plant, it would require only a fraction over 11 acres to supply the State's present annual needs. These figures may prove delusive, but they represent the only means I have of arriving at conclusions respecting the ultimate prospects before anyone who desires to enter upon the production of culinary herbs as a sole source of income. The immediate prospects with thyme, for instance, at 1s. 3d. to 1s. 6d. per lb. seem alluring, and should be taken full advantage of in established gardens, but it must not be forgotten they are purely the results of abnormal circumstances, and cannot expect to continue for any lengthy period beyond the return of peace and the rehabilitation of the world's commercial interchanges.

If the consumption of the whole Commonwealth be in even or greater proportion per capita to that of this State, the prospects for present expansion do not offer an oportunity for this work being entered upon on an extensive scale. As one merchant has put the matter "there would be no great increase in consumption, whatever the price. Only increased population would increase the consumption." Notwithstanding this, the growing of culinary herbs in plots of increased area by our market gardeners and small blockholders is justified until the imported article becomes a thing of the past. Anyone desirous of entering upon this work systematically would do well to study a small book on "The Cultivation of Culinary Herbs," written by M. G. Kains, and published by The Orange Judd Co., of New York, U.S.A.

In respect to the adaptability of the different herbs of commerce to the conditions of soils and climates prevailing in this State, one even without local experience could reasonably conclude that as they are mostly indigenous to or are grown freely in the Mediterranean regions, that there is no serious drawback to producing them here, in fact more than one species has already acclimatized itself in a wild state in South Australia. Local experience substantiates this, as our merchants without exception inform me in unmistakable terms that "what little is grown here is of very good quality, and a further advantage is that we can obtain it fresher and more pungent."

The following is a list of the common and botanical names of most herbs used in culinary operations with the natural habitat of each attached. It will be seen that with few exceptions they belong to two natural orders, viz., the Labiatae and Umbelliferae. From the former the leaves and from the latter the seeds yield the desirable flavoring qualities.

LABIATAE.

Sage—*Salvia officinalis,* Linn., indigenous to S. Europe and N. Africa.

Savory (summer)—*Satureia hortensis,* Linn., indigenous to Mediterranean countries.

Savory (winter)—*Satureia montana,* Linn., indigenous to S. Europe and N. Africa.

Thyme—*Thymus vulgaris,* Linn., indigenous to Mediterranean coasts.

Marjoram—*Origanum vulgare,* Linn., indigenous to Europe.

Balm—*Melissa officinalis,* Linn., indigenous to S. Europe.

Basil—*Ocimum Basilicum,* Linn., indigenous to tropical Asia.

Spearmint—*Mentha spicata,* Linn., and *Mentha viridis,* Linn., indigenous to Mediterranean shores.

Peppermint—*Mentha piperita,* Linn., indigenous to Northern Europe.

Rosemary—*Rosmarinus officinalis,* Linn., indigenous to Mediterranean shores.

Clary—*Salvia sclarea,* Linn., indigenous to Mediterranean shores.

Pennyroyal—*Mentha Pulegium,* Linn., indigenous to Europe and Asia.

Horehound—*Marrubium vulgare,* Linn., indigenous to Southern Europe.

Hyssop—*Hyssopus officinalis,* Linn., indigenous to Mediterranean shores.

Catnip—*Nepeta Cataria,* Linn., indigenous to Southern Europe.

Lavender—*Lavandula vera,* DC., and *Lavandula Spica,* Cav., indigenous to Southern Europe.

UMBELLIFERAE.

Parsley—*Carum Petroselinum,* Benth. and Hook., indigenous to Mediterranean regions.

Dill—*Anethum graveolens,* Linn., indigenous to Mediterranean shores.

Fennel—*Foeniculum officinale,* Linn., and *Foeniculum dulce,* DC. (Florence Fennel), indigenous to Southern Europe.

Anise—*Pimpinella anisum,* Linn., indigenous to South-West and South-East Asia and Northern Africa.

Carraway—*Carum carui,* Linn., indigenous to Asia Minor.

Coriander—*Coriandrum sativum,* Linn., indigenous to Southern Europe and China.

Chervil—*Scandix cerefolium,* Linn., indigenous to Southern Europe.

Cumin—*Cuminum cyminum,* Linn., indigenous to Northern Africa and Egypt.

Lovage—*Levisticum officinale,* Koch, indigenous to Mediterranean shores.

COMPOSITAE.

Marigold (Pot)—*Calendula officinalis,* Linn., indigenous to S. Europe.

Tansy—*Tanacetum vulgare,* Linn., indigenous to Europe.

Tarragon—*Artemisia dracunculus,* Linn., indigenous to S.E. Europe and Northern Asia.

Southernwood—*Artemisia abrotanum,* Linn., indigenous to Southern Europe.

RUTACEAE.

Rue—*Ruta graveolens,* Linn., indigenous to Mediterranean shores.

BORAGINEAE.

Borage—*Borago officinalis*, Linn., indigenous to Mediterranean regions.

RANUNCULACEAE.

Fennel Flower—*Nigella sativa*, Linn., indigenous to Asia.

LILICEAE.

Chives—*Allium Schoenoprasum*, Linn., indigenous to Europe.

MEDICINAL HERBS.

In regard to this phase of herb production, I am not competent to speak, other than to say that many of the plants whose properties are used in the making of medicines are known to me as being suitable for growing in some parts of this State, but to quote the statement of the manager of one of our wholesale druggists establishment, "Unfortunately there are few buyers for many of the drugs (plants yielding the drugs). The reason we (meaning the British) have been dependent upon Germany for supplies is because our people will not devote their time to the cultivation of anything which will yield them only a small sum annually. If gardeners would make a specialty of cultivating—even if each man took one variety only as a side line—he would probably be able to get a market for his produce. Every medicinal plant, with the exception of Chichona (*C. succirubra*)—the source of quinine—may be cultivated in some part of this continent, and we have been neglectful of our duty to the country by failing to introduce them." Following this is courteously supplied a long list of names of well-known medicinal plants, with the quantities of leaves or roots now being imported for use in the firm's laboratories, and the writer concludes with the significant remark, "These quantities we hope to considerably increase when we remove our laboratory to the works."

The following are the plants referred to, with the trade name, also the parts of the plants utilized for medicinal purposes:—

Aconite (*Aconitum Napellus*), roots and leaves.
Alkanet (*Anchusa tinctoria*), roots.
Angelica (*Archangelica officinalis*), roots and seeds.
Bryonia (*Bryonia spp.*), root.
Calamus (*Acorus Calamus*), rhizome.
Belladonna (*Atropa belladonna*), roots and leaves.
Buchu (*Barosma betulina*), leaves.
Coca (*Erythroxylum coca*), leaves.
Columba (*Jateorhiza columba*), roots.
Colchicum (*Colchicum autumnale*).
Damiana (*Turnera spp.*), leaves.
Digitales (Foxglove), (*Digitalis purpurea*), leaves.
Gentian (*Gentiana lutea*), roots.
Glycyrrhizae (Liquorice) (*Glycyrrhiza glabra* and *spp.*), roots.
Hellebor (*Helleborus*, *nigra* and *alba*), roots.
Hydrastis (*Hydrastis canadensis*), roots.
Hyoscyamus (*Hyoscyamus niger*), leaves.
Jaborandi (*Pilocarpus jaborandi*) (*Rutaceae*), leaflets.
Inulae (*Anacyclus pyrethrum*), roots.
Ipecacuanha (*Psychotria ipecacuanha*), roots.
Iridis (*Iris spp.*), roots.
Mazerian, or Mezereon (*Daphne mezereon D. laureola*), bark.
Podophyllum (*Podophyllum emodi*), roots.
Pyrethrum (*Chrysanthemum cinerariaefolium*), flowers.
Rheum (Rhubarb), (*Rheum officinale* and other *spp.*), roots.
Serpentaria (*Aristolochia serpentaria*), roots.
Sanguinaria (Sanquinarina) (*Sanguinaria canadensis*).
Squills (*Urginea scilla*, and *Urginea indica*), roots (bulbs).
Taraxicum (Dandelion), (*Taraxicum officinalis*), roots.
Valerian (*Valeriana wallichii*), roots.

ASSISTING THE ORCHARDISTS.

For some time the Government has had under consideration a recommendation made by the Horticultural Instructor for the better utilization of the services of the orchard inspectors on his staff.

The Minister of Agriculture has now decided that several of these officers, who were practical fruitgrowers and owners of orchards prior to entering the Public Service upwards of five years ago, shall in future be encouraged to apply more widely the knowledge they have gained and act as advisers to fruitgrowers as well as inspectors under the laws dealing with plant diseases, &c.

They will be instructed to get into touch with the Branches of the Agricultural Bureau and Fruitgrowers' Associations in their respective districts, and arrange to meet these bodies for the purpose of giving addresses on subjects of interest to fruitgrowers and gardeners, as well as give demonstrations of pruning, spraying, fruit-packing, etc., at the periods of the year deemed most desirable for each. They will also visit and advise growers or intending planters individually whenever applications for personal attention are made.

This decision should to a certain extent meet the desire expressed in a motion brought forward at the recent Annual Congress of the Agricultural Bureau to the effect that arrangements should be made to enable the departmental officers to give more time to the outlying Branches of the Agricultural Bureau. The local, as well as the general knowledge possessed by these officers will doubtless enable them to prove of great value to new settlers, such as returned soldiers who may take up rural occupations, within their respective districts. Their duties will be so arranged that whilst endeavoring to help those who desire information, no laxity will be shown towards orchardists and owners of small, non-commercial fruit gardens who neglect to keep them reasonably free of the more serious pests.

These officers will also act as guardians of the interests of the rural producers by enforcing the provisions of the laws dealing with the sale of fertilisers, hay and chaff, fruit in cases, and insecticides.

The officials in question and the respective areas they will traverse are as under:—Mr. C. H. Beaumont, in charge of the Southern District, which takes in the whole country below a line drawn from Brighton northwards to the overland railway line at Eden Hills, and extending along that boundary to the River Murray. Mr. H. J. Darwent's district joins this on the north side of the overland railway, and extends along the Mount Lofty Ranges to the Para River past Kersbrook, and from thence eastward past Mount Pleasant to the River Murray. Mr. G. L. Wishart's district extends from Williamstown through the Barossa, Stanley, and Wirrabara fruit-growing areas. In the South-East an officer will be selected to succeed Mr. R. Fowler, who was recently appointed to manage the State Experiment Orchard at Blackwood.

THE AGRICULTURAL BUREAU.

CONFERENCE AT CHERRY GARDENS.

(Continued from page 241.)

THE CULTIVATION OF ONIONS IN THE HILLS.

Mr. John Roebuck (Longwood Branch) contributed the following paper on this subject:—"On our small holdings in the hills, where the late frosts often damage such crops as potatoes, beans, tomatoes, etc., onions are a reliable crop to grow if proper attention is paid to their cultivation. In my thirty years' experience I have found the following methods as good as any. When selecting onions from which to grow seeds, first decide whether the crop is for late keeping or for marketing straight off the land. The hard keeping sorts do not crop nearly as heavy and are not usually so juicy or mild in flavor as the softer sorts, which do not keep long, and I find the plants are more difficult to raise in our cold and wet districts. If both early and late sorts are grown, the seeds must be grown a good distance apart, as they readily hybridize. Select sound, fair-sized bulbs of good color, firm right up to the neck, which should be small. Plant them in rows about 2ft. apart by 1ft. in the rows, deep enough to bury the bulbs, leaving the neck showing above ground. No more than, say, three rows should be planted in one patch, or they will be difficult to hoe and weed when the seed stalks are growing. Plant the keeping sorts in July. Softer sorts will have to be planted earlier, as they will have started to grow. The land should be well manured and deeply dug. The seed is ripe when it shows black on the seed heads. Cut the heads off and spread them out to dry. Then thrash out ready for sowing. New seed will germinate more quickly and grow stronger than one-year-old seed; after two years it is not reliable. The most difficult part of onion cultivation in the hills is raising the plants, as they have to grow in the cold winter months. I have tried sowing the seed where the onions were to grow, but I soon turned that down, as they took much longer to thin out and weed than it takes to transplant from seed beds. Select a warm sunny slope if possible for seed beds. Well-drained, sandy loam is best. Dig in a good dressing of stable manure early in March, then put another dressing of short stable manure on top and hoe it in. This helps to keep the surface loose, and gives the young plants a good chance to break through the ground. If necessary give it a good watering to start the weeds before the second week in April, when the first onion seeds should be sown. If they are sown earlier they are apt to seed when planted out. Sow two or three lots with about a week between, or all the plants may be ready at one time, and some may get too old in the seed beds and go to seed when planted

Sow the seed in drills about 8in. apart and 1in. deep. Leave every seventh drill unsown and the patch will be in beds of six rows each, with a 16in. footpath between each bed. This leaves room to get among the plants to hoe and weed them. I make a wooden drill or marker to mark out six or more drills at a time. Raking the bed lightly just when the first plants break through the ground saves a lot of weeding afterwards and does not hurt the plants. If the plants are at all backward, when about half grown water them with rather strong liquid fowl manure or sulphate of ammonia. When they are nearly the thickness of a penholder they are fit for planting out. When drawing the plants from the bed, shake the soil from the roots and put them in straight bundles. The nearer they are to straight the quicker they can be planted out. If they are too long, cut the tops back with a sharp spade while the bundles are on the ground. I never cut the roots, as long roots are a help in our way of planting out. It pays to manure the land well to grow onions. Put a dressing of stable manure on in the autumn unless the land is already in good heart. Plough in, and leave until planting time. Then plough or dig in not less than 5cwt. of good bonedust to the acre. I usually plough two furrows deep, about 10in., but it is difficult at this time of the year to break the land down fine enough with the plough, and I get the best results from dug land. Then put another 5cwt. of bonedust per acre on and harrow down if ploughed. Then rake the land down fine and mark out in the same way as for the seed beds, only not to so great a depth. After a start is made no line is needed, as the first tine of the marker is drawn along the last mark made. Tread out every seventh row, leaving the land in beds of six rows 8in. apart, and put the plants in about 3½in. to 4in. apart in the rows. They should be put in straight with each other in the rows, so that a wheel hoe can be worked close up to them. The wheel hoe is much easier and quicker than hand hoeing. When planting we do not make a hole to put the plant in and press the soil to it. We take a handful of plants in the left hand, place the roots on the line, and with a dibble (made from a 5in. nail driven into a piece of wood for a handle, sharpened and slightly bent at the point) press the roots into the soil until the plant stands upright. This is an easy and quick way, and a good planter will put in 10,000 in eight hours. It is important that growing onions should be kept free from weeds. As soon as the plants have got a good start, put on about 1cwt. of sulphate of ammonia per acre. Last year I tried a patch with two dressings like that, and we could see to the row almost by the dark foliage where it was put. In places where water is available the use of sprinklers is better than running the water on, as it can be more evenly distributed, but if it is necessary to run the water on, the footpaths between the beds are very useful for that purpose. Do not let the onions get a check in a dry spell if you can help it, or the thrips may reduce the crop very considerably, and it also interferes with their keeping quality. It is not necessary to break down the tops when they are nearly ripe—they will go down themselves when ripe.

They should then be pulled and put in rows to dry. Cover them with the tops, weeds, or anything handy to shade them from the hot sun, which is apt to scorch them. In a few days the tops and roots should be cut off and early sorts bagged for market. I have found it a good plan to put keeping onions in banana crates and stack on the ground for a few days to dry before taking them into the store. They may be stored 3ft. or 4ft. deep on a wooden floor, which should be at least 1ft. from the ground, on shelves in the store, or left in crates under a shed. It is important to have them thoroughly dry when storing. Onions may be successfully grown on the same land for years, but it is better to alternate with some other crop. They may be grown on a variety of soils, but a deep, dark, sandy loam will grow good crops of good quality. There is a great deal of work in onion-growing, but a crop should return from 10 to 20 tons per acre. I have taken from a small patch 4cwts. to the rod, which works out at 32 tons per acre, and I am satisfied they are a good crop to grow on small holdings.''

OTHER OPINIONS.

An animated discussion followed the reading of the paper. Mr. Johnston (Uraidla) mentioned that he had found it more satisfactory to grow the young plants on the plains, a practice that did not appeal to Mr. Blakeley (Longwood), who stated that he had been very successful in raising the young onions in the hills. The secret of his success was the use of stable manure. He placed a 9in. layer of manure on the ground, dug it in, and then applied a further dressing 3in. deep. He marked the area out into beds 15ft. long, scooped out furrows 1in. deep, and placed the seed into these. The seed was then coverēd, a plasterer's trowel being used for the operation. The time of sowing was the last week of April or the first week of May. Mr. Roebuck agreed that the chief factor was to keep plenty of stable manure near the surface. It kept the ground warm, and tended to prevent the rains consolidating the soil around the plants.

FREE PARLIAMENT.

THE YOUNGER GENERATION.

Mr. G. Summers referred to the importance of instilling a practical interest in agriculture into the boys and girls, and mentioned steps that had been taken at Blackwood in the way of potato-raising competitions. He moved—"That it be a recommendation from this Conference that the Branches of the Bureau seek in every way possible to foster experimental work amongst children." The motion, which was seconded by Mr. Magarey (Blackwood), was carried.

NOXIOUS WEEDS.

At the instance of Mr. Pocock (Morphett Vale) it was decided to support the resolution carried at the recent Annual Congress to the effect that the administration of the Noxious Weeds Act should be vested in the hands of the district councils, with independent Government authority behind, and that a schedule of noxious weeds should be prepared on the recommendations of a select committee.

ADVISORY BOARD OF AGRICULTURE.

Minutes of meeting of Advisory Board of Agriculture held on Wednesday, October 3rd. Present—Messrs. Geo. Jeffrey (Chairman), Professor A. J. Perkins, W. J. Colebatch, F. Coleman, J. Miller, C. J. Tuckwell, T. H. Williams, A. W. Shillabeer, Colonel Rowell, A. M. Dawkins, and the Acting Secretary (H. J. Finnis).

Dairying Industry.—A subcommittee consisting of the Chairman, Messrs. Tuckwell, Colebatch, and Shillabeer, was appointed to report on the supervision of the dairying industry in this State.

Compulsory Spraying.—It was proposed to seek the opinion of the Vinegrowers' Association on the proposed regulations for the compulsory spraying and swabbing against insect pests and fungoid diseases.

Herb-growing.—The Board received from the Horticultural Instructor (Mr. Geo. Quinn) a report on the establishment of herb-growing on a commercial basis in this State. It was decided to ask the Horticultural Instructor to prepare a *resume* of his report for publication.

Rail Carriage of Dairy Produce.—A report was received from the Railways Commissioner on various questions submitted to him by a deputation representing dairy factories, and introduced by Mr. Tuckwell.

Business from Branches.—The Board approved of the alteration of the name of the Forest Range Branch to "Lenswood and Forest Range."

It was decided that it was undesirable to take action in the direction of securing the release from school attendance of the scholars of the upper classes to enable them to assist in shearing operations, as suggested by the Kanmantoo Branch.

It was decided to forward to the Hon. the Minister a resolution from the Elbow Hill Branch requesting that jetty tolls imposed on ports of Eyre's Peninsula and other ports of the State should be abolished.

Congress Resolutions.—The resolution passed by Congress, recommending the extension of the Stock Diseases Act to provide for the compulsory dipping of sheep in poisonous dips in all district council areas, was forwarded to the Hon. the Minister with a statement to the effect that the Board supported the resolution.

The Congress resolution, requesting that agents should supply farmers with receipts showing the weight of each bag of wheat delivered together with a resolution to a similar effect from the Pinnaroo Conference, was forwarded to the Wheat Harvest Board through the Minister of Agriculture.

The Minister of Agriculture's attention was also directed to the resolution at Congress to the effect that the services of the departmental experts should be more readily available to the smaller and outside branches of the Agricultural Bureau.

A Congress resolution, that "Closer settlement legislation should be amended in order to provide that individual farms might be purchased by the Government, and allotted under the system of extended payments adopted when large holdings are purchased and subdivided," was also referred to the Minister of Agriculture.

A resolution of the Pinnaroo Conference that "This Conference is of the opinion that it is in the interests of the horse-breeding industry that no stallion unable to obtain a certificate from a qualified veterinary surgeon be permitted to be used for other than private purposes," was considered. Members of the Board agreed that the proposal was unworkable at the present time owing to the shortage of qualified veterinary surgeons, and it was thought impracticable until there was some scheme of insurance against the loss of a certificate.

Australian Made Cornsacks.—An intimation was received from the Prime Minister to the effect that, except under the provisions of the War Precautions Act, the Federal Government had no authority to regulate the size and quality of cornsacks manufactured in Australia. It was decided to recommend the Minister of Agriculture that steps should be taken by the State Government to ensure that locally manufactured cornsacks conformed in size and quality to the same standard as was required of the imported article.

Life Members.—The name of Mr. W. Smith, of the Watervale Branch, was added to the list of Life Members of the Agricultural Bureau.

The Appointment of Secretary.—It was unanimously decided to request the Minister of Agriculture to appoint the present Acting Secretary permanent Secretary to the Advisory Board.

New Members.—The following list of names was added to the list of existing Branches:—Pinnaroo—H. V. Ellis, H. Tolhurst; Lyndoch—F. H. Klauber; Borrika—T. O. Moore, E. W. Irwin; Carrow—W. A. Hunt; Renmark—E. D. Wills, A. Strachan, I. Corney, E. Barber; McNamara Bore—H. M. Aitkins; Salisbury—J. Harvey; Berri—C. G. Savage, P. M. Wilksch, J. Hughes, V. C. M. Fowles; Lone Pine—E. G. Hoffman, T. Wallace, G. Braunack, N. Schwarz, A. Dahlenburg, C. Dahlenburg; Salt Creek—J. N. Jacobs; Eurelia—J. Roach; Rosenthal—L. M. Carrol, E. Howell; Mount Barker—E. F. Stevens; Crystal Brook— W. H. Wilkin; Tarcowie—T. Lemm, G. Hortin; Parilla Well—A. Young, J. L. Badman, Fred Huckel, J. Guthlebere; Kalangadoo—F. J. Mills; Narridy—L. V. Price, E. E. Richards, W. G. Johncock, E. Johncock; Eurelia—John Roach; Butler—D. C. Stewart, C. Williams; Morphett Vale—B. L. Lyons; Carrieton—H. S. Teague; Hartley—G. Phillips; Mount Remarkable—H. D. Shiels, R. H. Davies, C. W. Fuller, A. T. E. Standing, W. E. Knight, H. C. DeGraaf, C. H. Baldwin; Port Germein—T. H. G. Nancarrow, J. Teasdale; Penola—S. McWaters, E. R. D. Hinze, F. R. Temple, T. F. Oswald, F. J. Kidman; Kadina—John Hore, F. Bayne; Rosy Pine—C. J. O'Loughlin, J. Canny; Mount Gambier—J. Hart, F. B. Davison; Ramco—R. Modistach; Morchard—W. A. Brown, R. L. Bates, R. L. Davy, R. V. Piggott, E. O. Bowman; Coomandook—J. T. Brown; Wynarka—J. Nosworthy, Frederick Nosworthy; Booborowie—W. C. Warner; Brentwood—S. G. Martin;

Mount Barker—I. Dutch, A. Howard; Redhill—J. A. Potts, S. A. Pengilly; Balaklava—W. MacPharlin, H. G. Masters; Brinkley—R. Richter, W. H. Schubert; Coonawarra—W. Hoffmann, P. C. Stafford, H. B. H. Richardson, R. Redman, W. H. Redman, V. Pounsett, J. Redman, W. L. Redman, R. McLean; Kanmantoo—M. Carling; Tarcowie—W. Hortin; Clare—P. Tall; Morphett Vale—Rev. A. E. Page, Jas. Collins; Cherry Gardens—H. Strange; Hookina—T. Tulloch, B. Kelly; Wirrabara—A. McKenzie; Lameroo—E. Scharnberg; Nantawarra—J. H. Nicholls; Yallunda Flat—G. Smith; Koppio—H. C. Meadows; Colton—J. North, V. Lewis, F. Agars; Moonta—W. J. Pearce; Maitland—D. E. Madigan, C. B. O'Reilly, R. Kelly, J. Marshall; Kongorong—J. Aslin, H. Perkins, R. Adams; Mindarie—W. L. Stone; Bookpurnong E.—H. Ford, R. H. Fox; McNamara Bore—H. Kelly, E. Thorstensen, W. Wilford; Edillilie—J. Bryce, C. H. Smith; Yaninee—R. Hicks, C. Page, J. C. A. Bieske, T. Bieske, J. Daly, C. H. Meldren, T. L. Nottle, C. H. Harnson, E. Kammerman, C. Lodge, F. Heylan; Yeelanna—J. H. Wagner, N. G. Dennis, J. F. Kammerman; Pompoota—J. Holland, W. M. Clark, A. Wright, W. Camphynder; H. W. Bennetts, W. Harper, R. Keays, W. J. Myers, G. Wilson, A. G. Ris; Uraidla and Summertown—J. Murfitt, J. D. A. Drinkwater; Penong—W. Bennier, A. F. Grad; Elbow Hill—H. Zerk; Riverton—F. Wait, S. Wait, J. W. Kirk, F. W. Wuttke; Coonalpyn—H. Watson; Goode—E. W. Watson; Coomooroo—W. Robertson, N. S. Lillicrapp; Blackheath—Ray Talbot; Willowie—D. O. Tilbrook, F. Starkey; Renmark—A. G. Alexander; Crystal Brook—R. F. Penton, J. J. Dridan, H. K. Dridan; Cummins—W. A. Hockley; Blackwood—W. Conlon, E. Sullivan, H. Wescomb, H. Jones; Clanfield—J. Perry, C. Moyle; Glencoe—C. Childs, P. S. Mitchell; Claypan Bore—G. A. Northcott; Parrakie—J. Clark; Mundalla—A. D. Low, R. Wiese, G. Hillier; Frances—Alb. Barrett; Borrika—R. E. Kalms, E. O. Zibel; Butler—D. P. Butler, W. O. E. Treasure, N. G. Stewart, S. E. Osterberg; Rosenthal—J. M. L. Carroll, E. Howell, J. Neumann; Renmark—R. F. Penton; Mount Barker—P. F. Liebelt, J. F. Liebelt, C. Liebelt; Green Patch—K. J. Hyde, P. T. Cockrum; Port Elliot—H. Smith; Wirrabara—Jas. Hayes.

A GOOD RECOVERY.

The somewhat surprising recovery of a middle-aged ewe which, although able to move about all right, when caught showed a large open abscess in udder, is reported by a correspondent. Through the opening a full grown decomposing lamb was drawn. The animal then got up and ran away, and a fortnight later was found with a bowel protruding through the same hole. This was pushed in and sewn in, and the ewe made good recovery. The Veterinary Lecturer comments that this is one of those somewhat rare cases in which rupture of the uterus occurs and necrosis of the abdominal wall follows. As a rule peritonitis sets in and the ewe dies. The lesson here is that nature treats even alarming conditions very well sometimes.

LINES AND POINTS IN RELATION TO THE SYMMETRY OF THE HORSE.

[An address delivered at the Annual Agricultural Bureau Congress by F. E. Place, B.Sc., M.R.A.S.E., &c., Government Veterinary Lecturer.]

Lines and points may sound more like a dissertation on railway matters than an address on veterinary subjects, and who should blame a "vet." in these days of motor traction if his mind becomes a little anticipatory on such lines. The lines and points now to be considered are, however, those of the horse, and this address is the outcome of a quizzical remark made some time ago, when on being asked to justify my opinion on a certain animal, I had to admit he was my fancy because he was—a woman's reason, perhaps, but not to be despised on that account. Counsel for the other side being no better able than myself to justify their choice adopted the ancient device of "no case, abuse the other side," and said that a scientific opinion should be capable of being supported by mathematical facts. Hence this attempt to cabin, crib, confine the illimitable of equine beauty within the bounds of lines such as described on the opening page of a geometry book, and as one who tries to think correctly I have misgivings at the outset that the attempt will be no more successful than dogma and creed have been in defining the limitless. But it stands to reason that an eye for a horse and judgment must have some basis, often only empirical and unconscious, none the less valuable for that, often it is to be feared based on an overmastering personality asserting itself, generally on the careful avoidance of former mistakes, and sometimes by the comparative method. None of these require the callipers and rule, but all of them will benefit if a standard can be found by which to measure. For, as Lord Kelvin said, "Accurate and minute measurement seems to the non-scientific imagination a less lofty and dignified work than the looking for something new. But nearly all the grandest discoveries of science have been the reward of accurate measurement and patient, long-continued labor in the minute sifting of numerical results."

And here I would warn my hearers that I am not going to attempt to formulate such standard, merely to suggest that such exists, and may in future years be as accessible to the horseman as the scale of the Babcock or Gerber test is to the dairyman. In the measurements to follow I make no apology for quoting the metric system. I do so because the newspapers of to-day use it freely in their war reports; because it is the *lingua franca*, the esperanto of scientific men; because in the near future we shall all use it; and because I am going to quote freely from French observers. Then, too, 10 centimetres are within a very small fraction of an inch the horseman's measure, the hand; so by the extremely simple method of cutting off the last figure, quotations in centimetres can be thought of in hands.

As I am addressing a mixed audience I must ask permission to explain a few scientific terms that I shall be obliged to use, for though many will be quite acquainted with them, others may not be, and without an understanding of them my remarks may not be as clear as might be wished.

THE CENTRE OF GRAVITY.

The first is the centre of gravity. All the particles of a body may be considered as so many small parallel forces having the same purpose and the same direction; their total sum is the weight of the body, and their result applied to one point is the centre of gravity. The vertical pressure of the centre of gravity to the ground is called the line of gravitation. The whole thing seemed simple enough to Sir Isaac Newton when the apple fell on his nose, and doubtless on reflection he realised that the centre of gravity is not the middle of a body, but is drawn nearer to the parts which weigh the most.

Now, in a horse it is not the easiest task to locate the centre of gravity because of the continual movement of the organs, their varying consistency, and so forth, but many careful experiments have been carried out, and the Tod Sloan seat has been evolved on account of them.

Speaking generally of the horse at rest, his centre of gravity may be found at the intersection of a vertical line that would be near the eighth rib, and pass through the gristle at the end of his breastbone, and a horizontal line that might be drawn from the point of the shoulder to the lower part of the upper third of his thigh bone, the lines, of course, passing through his bulk. The weight of the horse's fore end is about one-ninth greater than the hind, and the position of the head causes the weight of the fore extremity to differ from that of the hind by 10 kilos. Long necks give more weight to the fore extremity than short, strong ones. Movements, load, and formation of the withers all tend to alter the point of the centre of gravity. The distribution of weight in a cob. 1.50h. (15h.h.) will illustrate this:—Live weight, 445K.; Fr., 260K.; hind, 185K.; Diff., 75K.

EQUILIBRIUM AND BASE OF SUPPORT.

The next terms to consider are equilibrium and base of support. Equilibrium in mechanics is the state of a body induced by the forces which destroy one another or which are annulled by a resistance. In animals the body seldom rests upon the ground by a continued surface, it is supported by four columns, the limbs. The polygon or plot formed by the lines joining the four points which touch the ground at rest represents the base of support. It is sometimes a triangle, sometimes a line, and may be only a point.

But whatever the form and extent of the base of support, it is necessary in order to obtain equilibrium that the line of gravitation meet the ground within this base. The equilibrium will be so much more stable as the base of support becomes larger, the centre of gravity lower, and the line of gravitation nearer the centre of the base.

In the figure, if the centre of gravity is displaced from A to C, having reached the point C, the slightest oscillation of one side or the other CC′ for example will cause the line of gravitation to come outside of the base and provoke a fall. In stable talk, a heavy horse on spindle shanks that come out of one hole will have an unstable equilibrium. As the base of support has the form of an elongated rectangle with the horse at rest, the displacement of the centre of gravity from front to back will be much less dangerous to equilibrium than displacements which take place from side to side when the line of gravitation is moved much more easily from its base of support.

This explains why falls at a rapid pace hardly ever occur on the straight, but nearly always at the turn. It explains why the ambling horse, moving two legs on one side together, goes faster and falls more frequently than the trotter, which moves diagonal legs. Why the jumper, greatly displacing his centre of gravity falls so frequently, and why sideslips are so dangerous.

The instability of equilibrium gives the measure of speed. If from the fact of its displacements or from its situation being more or less raised, it is carried outside the base of support, it will cause the limbs to be displaced with a greater rapidity to support the body, as the fall is more imminent. The racehorse lengthens his body, extends his head and neck, and stretches himself out so as to bring the centre of gravity in advance of the movement as far as possible. The circus ring, of the same diameter from the days of the Caesars till now, is a real help to the old horse cantering round; he could not do his tricks on the straight, for the slightest lateral displacement of the centre of gravity would bring him to the ground.

THE LEVER.

The lever is the next piece of mechanism to consider; it is defined as a rigid inextensible rod supported on a fixed point. Though numbers of forces may act upon it they can always be reduced to two, and the machine will be in equilibrium when the resultant of the forces which move it is annulled by the reaction of the point of support; if equilibrium does not result the effect will be an action of the lever rod around the fixed point. The bones are the lever rods of the body, the forces that act on them are the muscles.

A contracting muscle draws its two ends nearer to its centre. As a rule each end is fastened to a distinct bone, and bones are not all equally movable, hence every muscle has a fixed and movable insertion, the latter being on the bone that moves most. But as muscles move under direction of the will, a movable insertion can become a fixed one, and *vice versa,* as in the case of the muscle that runs from the arm to the head, which at one moment may lift the arm to strike, and at the next bring the head round to bite. The volume of the muscles gives the measure of their force; their length that of speed.

Again the study of levers teaches us that the paths described by the lever arms are in direct ratio to their length, since they describe circumferences which are to each other as their radii. So that if one of the forces act upon an arm shorter than another, the longer will traverse a more considerable path. The point of support is nearly always on a level with the joint of the fixed bone, and is the centre of movement, the power is always applied at the mobile insertion of the motor muscle, and the resistance is at a variable point where the obstacles to the displacement of the mobile bone act.

According to the relative position of these three points we recognise three classes of lever:—First—Where the fixed point is between the power and the resistance as in the case of the muscles which stretch out the head. It is essentially the lever of extension, and it is also a lever of speed for the arm of resistance is always the longer. Second—The class of levers where the resistance is between the power and the fixed point are levers of force but not of speed, for the path of resistance cannot be as long as that of power. This class of lever is found in the muscles of the shoulder and haunch. Third—The class with the power between the fixed point and the resistance is the lever of speed and of flexion; it is the most common lever in the body, and examples occur in the flexor muscles of the limbs.

But in the horse's body it is almost impossible to analyse the movements of the muscles as they all interact one upon the other, while the movements of the joints represent a multitude of movements of inclined planes.

THE LIMBS.

The limbs are the supports and natural motors of the body, and the jointed columns of which they consist are naturally classed as a front pair and a hind pair. They consist of large masses of muscle at the top, and gradually diminish to mere skin and bone as they go down, an arrangement which disseminates and attenuates the combined actions of the weight and the velocity, for if they were clothed with muscle right down, their weight would be excessive and the step heavy and slow, both because of the size of the limbs and the lowering of the centre of gravity.

The front pair of limbs are a little in advance of and close to the centre of gravity, their principal work is to support the body and disperse concussion. As propellers they only come into play in moving a heavy load at a slow pace, when the forelegs slanting backwards give a push at the collar. This is brought about by the extension of all their articular angles when the toes are fixed into the ground, as may be seen by the slide a horse takes if the ground at this point of support gives way. Else the front leg is just a column of support, and an apparatus of dispersion and compensation for which double function it is remarkably well attached, fixed to the side by muscles and fibrous tissues, all its articular angles are wide open with the one at the knee always in evidence. It opposes to the body weight and locomotor movements resistances, mainly mechanical, whose passiveness eases muscular strain, by means chiefly of the bones, ligaments, and tendons. The hind limbs differ much from the front both in construction and function. They do less in support of the body, and are joined firmly by a bony joint to the bones which form the main column of the backbone.

By the movements of their different segments they push against the trunk, communicating force or velocity by the obliteration of their angles. As the muscles have to contract to oppose the closing of the angles of locomotion they are bigger and more numerous than those of the foreleg, and while doing their duty as supports their main work is to propel. They act with most ease and power against the trunk when their line of direction points obliquely downwards and backwards. When at the beginning of a pull they are more forward and under the body, a position that is very transitory, they are only balancing the body preparatory to the big push off.

THE MECHANISM OF IMPULSION.

Whichever legs we examine, the impulsive force, when they are acting as a support, is brought about by an extension of the bony segments, and the various sets of muscles support the limb in the same way that shrouds do a mast, thus there is no waste of power, while the arrangements of muscles and tendons in the hind limbs is such that one articular angle cannot be extended without at the same moment opening all the others, producing a process of force-accumulation which when carried to excess results in those spasmodic early movements known as stringhalt, these sudden and energetic spasms are noted only in the hind limbs.

This sketch of the equilibrium of the horse will naturally bring the mind to the proportions of the beast, which in general form will always be similar, though infinitely varied in detail, enabling one to group classes such as the thoroughbred and the shire and to discriminate in the show ring the winner from the waster, and lead us to talk about the horse that is all in one piece or the beast which is only thrown together. The public eye is often more pleased with a podgy, shining cob than with the long projecting lines, well marked muscles, strong limbs, roomy chest, broad joints, and open nostrils of a Carbine. Though the man in the street is never willing to allow his judgment to be at fault, he is a better judge of points than of lines as a rule.

THE DIFFICULTY.

How to overcome this difficulty has been the theme of writers dating back more than 500 years, belonging to every nation, and each producing a slide-rule method which will enable one to run a tape over a beast and apprise his form and value; no one has succeeded in the task, and I do not intend to compete. Saint-Bel, the French founder of my *alma mater* at Camden Town, came very near it with his measurements of Eclipse, taking the head as unit, but unfortunately he vitiated his deductions by an incorrect value of that unit, but there are, as he demonstrated, relations between the measurements of different parts of the body that materially help both eye and judgment, and to be exact in the latter one has not only to seek the relationships, but accurately estimate the differences, the method generally adopted by the judge, and infinitely more difficult than the mere mechanical measuring of relationships.

Taking as unit of measurement the head from the poll to the extremity of the upper lip when the animal is standing square and his head parallel to the slope of his shoulders, measured by callipers rather than the tape, because of the inequalities of surface, and considering our subject in flat profile we shall find that the length of the head almost exactly equals the distance—(1) From the back to the belly, NO (thickness of horse). (2) From the top of the withers to the point of the shoulder, HE. (3) From the upper fold of the stifle joint to the point of the hock, J'J. (4) From the point of the hock to the ground, JK. (5) From the hind upper corner of the shoulder blade to the point of the haunch, D'D. (6) From the end of the breastbone to the fetlock joint, MI (above this in thoroughbreds and large horses, below in small, and in the middle in medium). (7) From the upper fold of the stifle joint to the summit of the croup, but very often less.

Two and a half heads give:—(1) The height of the withers H from ground. (2) The height of the top of the croup from the ground.

(3) Very often from the point of the shoulder to the point of the buttock, EF.

The length of the croup, from the point of the haunch to that of the buttock, DF is always less than that of the head by 5cm. to 10cm. It is frequently the measure from the poll to the angle of the lips. The width from haunch to haunch is practically the same as its length or a very little wider. The croup DF is found four times in the same horse—(1) From the point of the buttock to the lower fold of the stifle joint, FP. (2) The width of the bottom of the neck, SX. (3) From the bottom of the neck to the angle of the lower jaw, XQ. (4) From the nape of the neck to the nostril or angle of the lip, nn′.

Half a head applies to several measurements:—(1) From the angle of the jaw to the arch of the eye, the thickness of the head, PQ. (2) From the throat to the arch of the neck, QL. (3) From the lower part of the knee to the coronet, TT. (4) From the bottom of the hock to the fetlock, VU. (5) The length of the arm, from the point of the shoulder to the elbow joint.

Having taken the head as unit it will be well to view it in profile for the relationships of its proportions. That of an average medium draught would give the following measurements:—

Length, AB from poll to end of lips	0.60m.
Thickness, CD, from angle of jaw, half head	0.30m.
Width of neck, IH, half head	0.30m.
Inner corner of eye to upper nostril, OR	0.30m.
Poll to inner corner of eye, AO	0.22m.
Thickness of head, PQ	0.22m.
QO and PG	0.22m.
PE middle face to spine maxillary	0.10m.

The line BE, from the end of the lips to the maxillary spine, is equal to EF, from the maxillary spine to the opening of the ear on the skull; to HG, from the insertion of the throat to the angle of the lips; QR, from the max. fis. to upper nostril; QB, from max. fis. to end of lip; OD, from inner corner eye to curve of jaw; OH, eye to throat.

Often equality exists between OB, eye to lip; AH, poll to throat; HB, throat to lip.

Looking at head in front, the greatest width is AB, the extreme points of the arches over the eyes; this width is 0.22m. It is also equal to AC or BC, arch to poll; AD, poll to middle face; DE to end of lip.

From the skull opening of the ear to max. spine, GF, is the same as FE; GC equals one-sixth of the head, or 10cm.; AG is a little longer, 12cm.

FI, between the two max. spines is 18cm., and equals OO; FR, max. spine to nostril; FP, max. spine to orbit; G, to tip of ear; PQ, from supra orbit to intersection of ear on poll.

CO equals OT and FS; TT equals PG; the width between the nostrils is that of the knee, or the width between the ears at the poll; MN, the lips is ½ AB, a little more than nostrils.

With regard to the limbs, mathematicians have from time to time tried to establish a parallelism and similarity of articular angles between the fore and hind legs, which though curiously enough, may work out an average satisfactory to the mathematical mind, would give us an average horse that would combine the make and shape of the blood and draught, which in practice would result in racehorse quarters and shire horse legs and other anomalies of a similar character.

The technique of the determination of the articular angles is outside the scope of this paper, but it may be accomplished by an ordinary blackboard compass with a protractor attached, or more permanently by the use of distinctive wafers, black or white, according to the color of the horse, attached to the skin over the articular centres, and taking a photograph. This method has the advantage of enabling one to compare the various angles and measurements, as they are all secured under like circumstances of position. Such a procedure naturally gives more stability to the judgment than a single glance of the eye can afford. This may be demonstrated schematically, as follows:—Take a foreleg with its axis of movement.

The heights a, b, c, of the segments which do not themselves lie parallel with the vertical line, are the sides of as many rectangular triangles whose hypothenuse and one of the adjacent angles are known, so by common trigonometrical formulae—

$$a = 0.41\text{m.} \sin 60 = 0.35507\text{m.}$$
$$b = 0.31\text{m.} \sin 55 = 0.25394\text{m.}$$
$$c = 0.17\text{m.} \sin 60 = 0.14722\text{m.}$$

Add the values of a, b, c, thus obtained to those of the vertical segments, those which lie parallel in their actual length with the vertical line; add to this 0.12 for the thickness of the skin shoe and hoof with cartilages in joints, and we have—

Shoulder, a	0.35507m.
Arm, b	0.25394m.
Forearm	0.36000m.
Knee	0.05000m.
Shin	0.24000m.
Pastern and foot, c	0.14722m.
Hoof, shoe, &c.	0.12000m.
	1.52623m.

The same calculations applied to the hind leg give the values of a, b, c, d.

a = 0.26m. sin. 35 = 0.14912m.
b = 0.39m. sin. 80 = 0.38407m.
c = 0.36m. sin. 70 = 0.33828m.
d = 0.17m. sin. 65 = 0.15407m.

This will give us the vertical height of the hind leg calculated from the normal length and inclination of the segments—

Haunch, a	0.14912m.
Thigh, b	0.38407m.
Leg, c	0.33828m.
Hock	0.08000m.
Shin	0.28000m.
Pastern and foot, d	0.15407m.
Summit of croup and haunch	0.02000m.
Skin, hoof, &c.	0.05000m.
	1.45554m.

The degree of opening of the articular angles has a marked influence on the development of speed, so one must note the following points:—

(1) The angles are alternately closed and opened during locomotion, their closing should shorten the limb as preparing for considerable extension. Their opening, as it lengthens the limb should move the foot as far as possible from its original position in order that the step may have great length and the push forward last as long as possible.

(2) The extent of the action of a joint is intimately dependent on the position of the bones which form it, when at rest. Speaking generally their separation increases it, and it grows less as they approach.

(3) In order that the movement of a joint may produce the greatest amount of useful effects, the rays of the angle must be separated in a very oblique direction, not in the vertical or approaching the vertical, the movement must be forward, not upward. Compare the knee action of a thoroughbreed and a park brougham horse.

(4) The degree of inclination of the locomotory segments is therefore capable of influencing the action of the articular angles in two ways—either by modifying its extent or its efficiency. The obliqueness of these segments should therefore satisfy this double requirement, namely, increase the efficacy of the action of a joint without diminishing its extent.

(5) To do this the upper parts of the limbs, the shoulder and croup, little movable, should tend rather towards the horizontal in

order to acquire more length without unduly increasing the height, to facilitate the back and fro movement of the lower parts of the legs, allowing them to freely extend themselves to cover the ground and give a good push. This horizontal position of the shoulder and croup implies in fast horses a greater closing of the upper angles, which in draught horses will be more open because of the greater rigidity of the limbs required in pulling.

(6) The lower segments, much more movable, are all the better for having, when at rest, only a slight oblique inclination, which brings them nearer to the vertical line passing through their centre of movement, because then the action of their articular angles develops the greatest amount of motion, in other words, there is much less wear and tear.

(7) There is no direct equality between the angles of the fore and hind limbs, but there is a tendency to equality in the following angles, the shoulder and thigh; the arm and stifle; fore and hind pasterns.

(8) All things being equal, the fast horse has his locomotory angles, upper and lower, less open than the draught horse, because of the greater slope of his shoulder, croup, and pasterns. While the other angles are more open and the segments a little longer, especially the shins.

(9) The importance of the angles lies in the fact that their disposition establishes or otherwise more favorable conditions for the development of force.

The judge has to apply these principles by means of a rapid glance, and does so by estimating the closure of the angle of the shoulder, by the slope and height of the shoulder. The angle of the hip by the straightness of the croup. We have seen that many common horses show the length of the head between the top of the croup and the upper fold of the stifle, while this is very rare in well-formed blood horses. Due most probably to the smaller hip angle in the blood. Having settled on a proper opening of the upper angles the lower ones can be judged by the regularity of equilibrium; for if the slope of the shoulder be good it is evident that the elbow will be in an advantageous position, provided the forearm be almost vertical, and the fetlock and foot well placed in relation to the vertical line. While if the croup is right, the direction of the leg will be also, because the hock will have a proper relation to a plumb line tangent to it. The correct opening of the upper angles commands that of the lower if the legs are properly set on for the support of the body, and the bone segments are the right length. The horse at rest will give an indication of his strength and speed.

Having discussed certain lines in detailed portions of the horse, we will now take what Trilby called the "all-together," the "ensemble" of our allies. When a man sets out to build a motor, the vehicle upon which the engine is mounted has to comply with certain conditions of height, length, and width, and the same relationship applies in the case of the horse, only Nature lays them down instead of the engineer.

The height of a horse is usually measured in his normal standing position from the top of the withers or croup, which points may be upon a horizontal line or on different levels, and the horse is said to be high or low in front according to the corresponding height of the croup. A lowering of some centimetres at the withers brings more load on to the front legs, and interferes with his equilibrium and speed, drawbacks which increase in proportion to the burden carried on the back, which is often added to the horse's own bulk. The region of the withers is more exposed on account of its prominence to bruises and wounds, especially from the saddle. While if the croup is low the hindquarters, wanting in action, have to use greater efforts, and the hocks go wrong. Such disastrous effects are only noticed when the inequality between the front and hindquarters is very marked, when it is slight they are little noticed, but still should be, for the cavalry horse, the pack horse, and the dray horse, always heavily loaded, will show the effects of being low in front much sooner than the racehorse, coach-horse, or trotter. In these, speed being the main desideratum, suffer much more from a defect in the hindquarters.

The hunter and the steeplechaser often have the croup considerably higher than the withers with advantage. In such cases the overloading of the front legs is compensated for by the relative lightness of the forequarters and the power and great length of the hindquarters. In them as with the hare, the hind limbs are carried well under the trunk, and their footprints are much beyond those of the front feet, the croup, loins, and bones of the back are well developed, and the shoulder very oblique. One never sees a horse three heads high, exceptionally they may be 2¾, but the usual thing is, as has been shown, 2½.

The sum of the height is composed of the factors of body and legs, and if they are not accurately adjusted there results a very serious defect in the working of the living machine. The length of the body from point of shoulder to buttock is normally 2½ heads, and very slight differences from this standard are quickly appreciable to the eye, a three-head length would look like a snake. But this line of length is no criterion of the shortness of the back and loins which governs the strength and fitness to properly utilise the push of the hindquarters. To estimate this, two factors have to be considered—(1) the length of the spine; (2) the length, direction, and relative situation of the shoulder and croup.

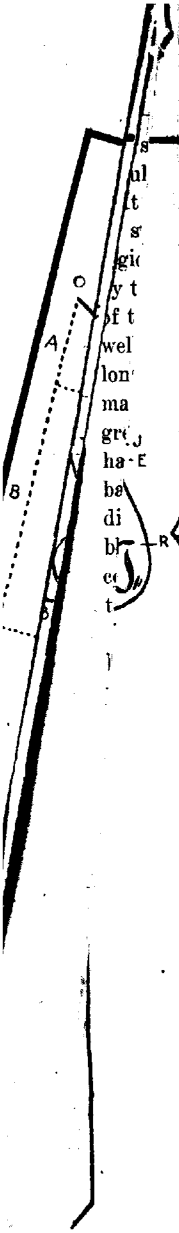
It is clear that the point of the shoulder and that of the buttock will be still more distant from each other as they belong respectively to regions longer, more inclined, and more separated. This may be judged by the distance between the hind angle of the blade bone and the angle of the haunch, which we have already seen is the length of a head in a well-formed horse. If it exceeds this it is so because the loins are too long, or from the position of the shoulder and croup, conditions which may be easily ascertained, and it follows that the horse which has the greatest separation between the hind angle of the scapula and the haunch will have the longest spine, and be likely to become chink-backed. But an excess in length does not always imply a like condidition of the backbone, but to the relative positions of the shoulder blade and croup, so that no hard and fast line can be laid down, and compensations have to be estimated from the appearance of the "all-together."

Measurements would lead us to believe that a perfect horse should be square, height and length should be equal, and yet this nuggety type is the very one which most good judges turn down from personal reasons which it would be hard to analyse. But such conformation forms a good base from which to point out certain results which follow abnormal deviations from it.

Let us vary the height of a well-formed horse without altering the relations previously existing between his body and limbs, he will at once seem too short, the centre of gravity has been raised without enlarging the base of support, the body will overweight the legs, which will have become longer without increasing the speed, because he will overreach. We have a locomotive unstable in equilibrium, weak in its parts, made taller to go faster, and failing to do so because of imperfect adjustment of mechanism, a narrow, tall, forging, stumbling weed.

We get on better if we lower the height, still leaving other relationships unaltered; our horse, however, now seems too long. We have lowered the centre of gravity, widened the base of support relatively, made the equilibrium more stable and the legs shorter, and though they will not now interfere they will be wanting in extent of movement and in power. The motor will be heavy, massive, and slow.

Identical conclusions would be reached if instead of varying the height we changed the normal relations of length and height. Excess of length would produce the same effect as if the body were too low, with the added defect of a chink back, a horse unfit for saddle, rambling in gait, and constantly crossing his legs. Such are the results to which extremes lead.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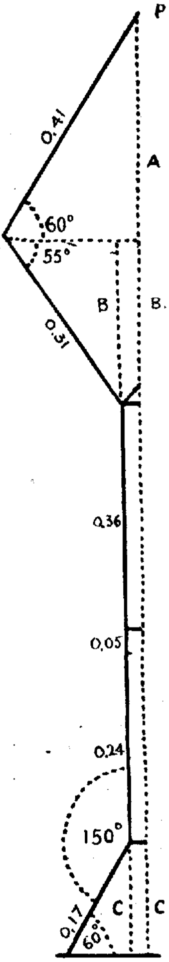
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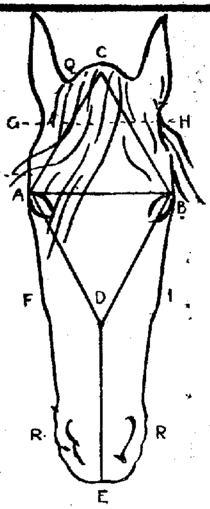
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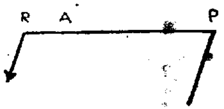
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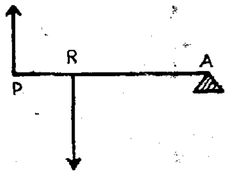
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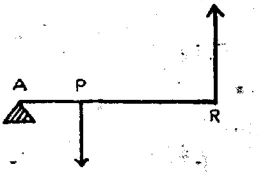
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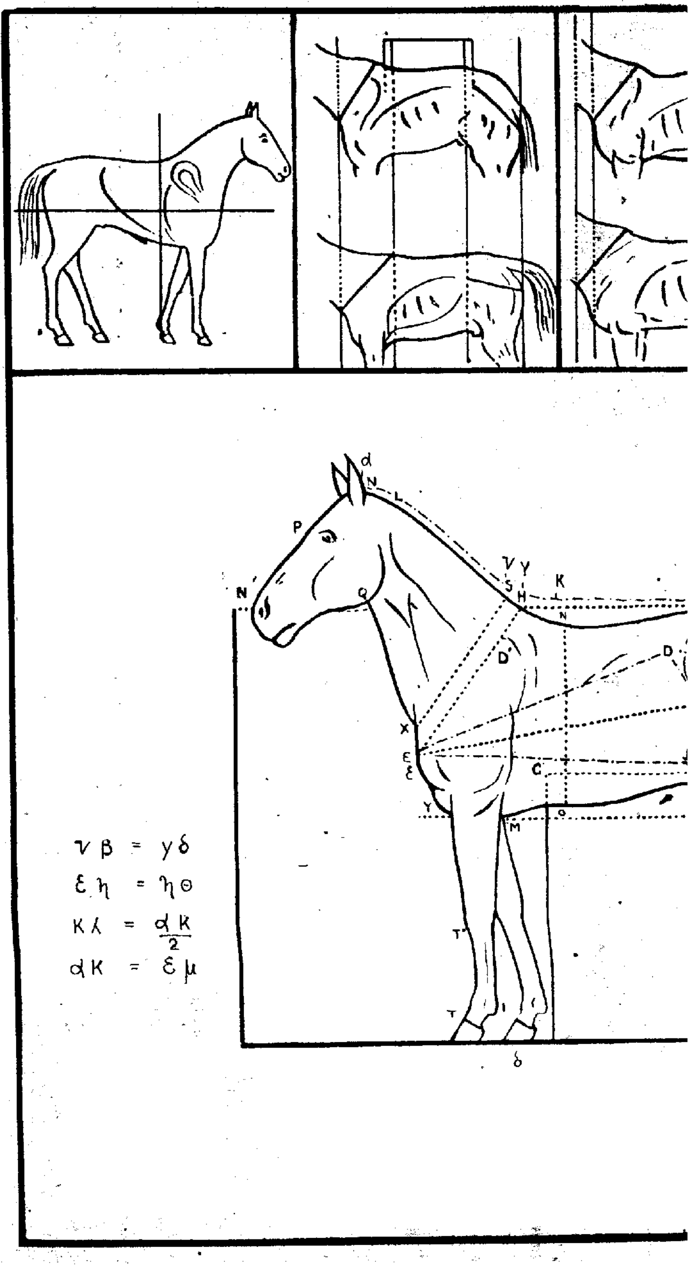
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Beginning with the idea that long limbs are necessary for speed, and that they should act on a long body, many people think that fast horses are longer than they are high, which is by no means the case. This has been proved by measurements of such well-known types as the Russian Orloff, the Arab, the American trotter, and the English thoroughbred. Excess in length amounting to the trifling amounts of 1cm., 2cm., 3cm., 4cm., or 5cm., is the exception, equality or even similar excess in height being the rule. For slow work this just mean remains a *fortiori* the same.

Width depends mainly on the muscular development of the breast, chest, and croup, and may be judged by viewing the horse from the front, the back, and from above when he is in harness. Naturally in the draught horse it is a quality of considerable value, as also in the coach horse; but in the racer, for instance, it can well be overdone, for it would increase the weight of the body, already somewhat high, it would lessen the stability of the equilibrium without increasing speed, and would overweight the legs.

In this class of horse, of which Carbine may be taken as an excellent though somewhat exaggerated specimen, one prefers a large development of skeleton, especially behind, remarkable in Carbine's case, a long chest, and dense firm muscles. From behind forward the horse must be wedge-shaped, that is croup much wider than chest, and if he inclines to height at the withers the power of the hindquarters will lessen the defect. Want of width gives us the lanky weed, whose front legs seem to come out of one hole and his hind ones, instead of being developed, appear to be just split.

The component elements of the height are the body and the limbs, their relation is not constant, and therefore must be considered. This relationship gives us a general division of horses into motors of speed and motors of power, otherwise light and draught, in light horses the limbs are proportionately longer, in draught shorter. There must be a good development of body, for in it are the organs of life such as the heart, digestive organs, and so forth; and if there is apparent want of proportion between the body and limbs the latter are most likely to be defective, for the veriest tyro is quick to perceive the defects of the narrow-chested, herring-gutted beast which cannot endure or obtain nourishment from its food. Thus the body must descend some cms. below the elbow at the end of the breastbone, the ribs well arched, widening as they run back, the chest a head wide in its middle; well developed rounded belly, also a head deep from back to middle. The limbs must be in proportion, for large wheels moved by a strong crank are no good to a locomotive if its boiler and piston are incapable of moving them; while on the other hand the best of bodies is powerless with weak ill-adjusted wheels, without force, without solidity, without speed, it will soon wear out, be it horse or motor.

One may see the type in advertisements of liniments, &c.; narrow, weak arms, legs, knees, hocks, and fetlocks, tendons weak, and muscles small. The fault can be checked, for between girth and pastern in an ordinary beast it will be a head's length; a little longer in a large horse, a little less in a small one.

The lines and points are those at rest; it would be wearisome to add the physiological value of the nerve impetus to the muscle, fibre, or the counterbalance of excess in one direction on weakness in another, the isolated value of a line, or the individual worth of a point.

In another system, the author of which is McGillivray, the tape is brought in to aid the eye, and laid from poll to buttock, α β. Sections of this will give certain constants, *e.g.*, γ β, the front of the withers to the buttock will be the height, γ δ. The point of the shoulder to the haunch ε η will equal the haunch to the back of the hock, η θ. The back κ λ, is half α κ, the poll to the withers. While α κ equals the distance from the point of the shoulder to the fold of the flank above the stifle, ε μ. If one takes the callipers and compares these lines with some of those already laid down an interesting agreement will be noticed, showing that different observers approaching the subject from various points of view coincide in their lines, and enable one to some extent to judge that—

> So did this horse excel a common one
> In shape, in courage, color, pace, and bone.
> Round-hoofed, short-jointed, fetlocks shag and long;
> Broad breast, full eye, small head and nostril wide,
> High crest, short ears, straight legs and passing strong;
> Thin mane, thick tail, broad buttock, tender hide.
> Look, what a horse should have, he did not lack.

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DAIRY AND FARM PRODUCE MARKETS.

A. W. Sandford & Co., Limited, report on November 1st:—

BUTTER.—It is pleasing to be able to report that the sale to the Imperial Government of the Australian surplus butter has been finalised on a basis of 151s. per cwt. f.o.b. for first grade, and less 1s. per cwt. per point below 90 grade. This is greatly relieving the minds of producers through the whole of the Commonwealth. In South Australia production substantially increased during October, and as practically no hot weather was experienced, there has been nothing to affect either condition or quality of the butter. The ruling rates at the last auction of the month were "Alfa," 1s. 3½d.; "Primus," 1s. 3d.; third-grade creamery, 1s. 0½d. to 1s. 1d.; choice separators and dairies, 1s. 0½d. to 1s. 1½d.; fair quality, 11½d. to 1s.; store and collectors', 11d. to 11½d. per lb.

EGGS.—Records are being established in the quantities of eggs coming forward, and picklers and manufacturers having been busily putting away, the market has kept nicely cleared. Values, however, were a little weaker in sympathy with the lower prices in the Eastern States, at the close of the month hen selling at 7d.; duck, 8d. per dozen.

CHEESE.—Large parcels have been coming to hand, and the absence of freight to Western Australia has caused stocks to accumulate somewhat. However, it is understood that negotiations are now in progress for the sale of surplus cheese to the Imperial Government. Quotations are from 8¼d. to 9d. for large to loaf.

HONEY continues a very scarce line, last season's take being practically cleared, and 5d. per lb. is readily obtainable for all prime samples. Beeswax saleable at 1s. 9d. per lb.

ALMONDS.—Only a few offering, Brandis being worth 1s. 1d.; mixed softshells, 1s.; hardshells, 7½d.; kernels, 1s. 11d. per lb.

BACON.—The warmer weather has stimulated demand for this line, with values well maintaining for sides and middles, while hams show a firm advance. Best factory-cured sides, 9½d. to 10d.; hams, 1s. to 1s. 1d. per lb.

LIVE POULTRY.—Farmers are wisely sending in their surplus poultry in view of the good rates now ruling. Demand throughout the month has been exceptionally brisk, and nice clearances have been effected at satisfactory prices. Heavy-weight table roosters, 3s. 3d. to 4s. 6d. each; nice conditioned cockerels and plump hens, 2s. 5d. to 3s. 6d.; light birds, 2s. 2d. to 2s. 6d.; ducks, 2s. to 3s.; geese, 4s. to 5s.; pigeons, 9½d.; turkeys, from 8d. to 11d. per lb. live weight for fair to good table birds.

POTATOES.—The past month has witnessed the complete exhaustion of potato supplies in the Mount Gambier and Millicent districts, and with the exception of a few locally grown new potatoes the Adelaide market is now depending on supplies from the Ballarat district. Prices have substantially advanced in sympathy with rise in Victorian market. ONIONS.—Locally grown new onions are now offering in fair quantities, but they are not yet sufficiently dry for sending long distances, so that there is still demand for old season's samples. Potatoes, £7 per ton, and onions £23 per ton on rails Mile End or Port Adelaide.

THE AGRICULTURAL OUTLOOK.

REPORT FOR MONTH OF OCTOBER.

The following reports on the general agricultural condition and outlook of the areas represented by the Government Experimental Farms mentioned below have been prepared by the respective managers:—

Booborowie.—Weather—Heavy thunderstorms have been prevalent during the month; one lasted for three days. The lightning and thunder were very severe. The rainfall for this month has exceeded any previous October since 1897, when records were first kept here. Crops have improved greatly, and a few of the early varieties are just showing in head. A fair yield of wheat may be expected off fallowed land, but very few crops are suitable for hay. Natural feed has grown very well the last fortnight, but is not rank and strong as was the case last year. Stock are looking very well, and the district is fairly heavily stocked. Pests—Rabbits are numerous and giving much work to the farmers. Miscellaneous—Fallowing is practically finished; the area of fallow is not as much as it should be, but the wet winter hindered the work.

Eyre's Peninsula.—The weather has been seasonable, with a comparatively greater amount of thundery conditions than is usual for the month of the year. Light rains were recorded on 10 occasions, and a heavy thunderstorm was registered on the 20th instant. Altogether 130 points have been recorded, which is a little above the average for the past three years. The total rainfall of the year (19½in.) to date speaks well for a record in these parts. Winds have not been quite so severe this month as last October, and crops are at present standing comparatively well. Red rust is showing rather thickly on the flag, especially of the later sown wheats; not much is as yet affecting the heads. Loose smut is plentiful. A few odd patches of take-all are noticeable on land carrying the second crop. Generally crops are heading very well. Feed is even more plentiful than last season, and grass seeds are becoming a nuisance. Stock are in tip-top condition. Flies have lately been noticed greatly troubling stock.

Kybybolite.—The weather has been beautifully mild with regular falls of rain, being just sufficient to keep the ground in good working order, and entirely suited to the seeding of the spring-sown crops. Crops—What crop there is in these districts is now making growth, and oats are showing out in ear. Most of the barley sown was seeded early in this month or late in September; it has generally come away well. The seeding of summer crops is well forward. Natural Feed—There is an abundance of natural feed, which is now at its best; it is perhaps a record year in the matter of feed in the back country. Stock are uniformly in good order. Miscellaneous—Fallowing operations are in progress, and shearing is general.

Turretfield.—Weather—The weather conditions during the month were very changeable. Quite a number of thunderstorms were experienced, and some hailstorms were recorded. There were no frosts, and the rain (186 points) for the month considerably benefited the crops. Crops have made very rapid headway, and the early varieties of wheat are out in head. There are slight traces of red rust, but so far no damage has been done, the rust being confined to the flag. Clean crops are the exception rathen than the rule. Natural feed has come on wonderfully, and there is an abundance of it. Stock are all looking well. Pests—The mice plauge is at an end; but there are still many rats, which are proving destructive and troublesome. Miscellaneous—Owing to the late start they got farmers are still busy with fallowing operations, and the fallowed fields need considerable working to keep down the weeds. Shearing has been completed, and a fairly good crop is reported. Most farmers are taking the precaution of dipping their sheep.

Veitch.—Weather—Rainfall at Veitch for October up to date, 238 points; average for same month, 79 points. Crops—The weather conditions have suited the crops in late sown fields, and in most cases they are making remarkable growth. The early sown wheats are very forward, and most varieties are showing red rust. Natural feed is good, but now is drying off a little. Stock are all in healthy condition. Pests—Rabbits are fairly thick, but the poison cart has reduced them in numbers. Miscellaneous—Haymaking operations are in progress in a few fields in the district.

RAINFALL TABLE.

The following figures, from data supplied by the Commonwealth Meteorological Department, show the rainfall at the subjoined stations for the month of and to the end of October, 1917, also the average precipitation to the end of October, and the average annual rainfall.

Station.	For Oct., 1917.	To end Oct., 1917.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
FAR NORTH AND UPPER NORTH.				
Oodnadatta	0·10	4·51	4·10	4·76
Tarcoola	0·62	7·97	5·91	7·58
Hergott	0·54	5·83	4·91	6·04
Farina	0·46	6·80	5·54	6·70
Leigh's Creek	0·64	10·29	6·04	8·66
Beltana	0·55	10·83	7·51	9·22
Blinman	0·90	13·47	10·85	12·83
Hookina	1·53	22·07	9·55	—
Hawker	1·33	23·65	10·43	12·22
Wilson	1·52	20·29	10·20	11·78
Gordon	0·92	18·13	8·68	10·26
Quorn	1·46	16·86	12·07	13·78
Port Augusta	1·99	12·82	8·17	9·46
Port Augusta W.	2·10	13·57	8·11	9·36
Bruce	1·11	14·16	8·49	10·01
Hammond	2·02	19·06	9·76	11·46
Wilmington	2·22	22·34	16·09	18·26
Willowie	1·36	18·64	10·18	11·90
Melrose	2·85	35·25	20·67	23·04
Booleroo Centre	1·80	20·98	13·58	15 83
Port Germein	1·67	15·15	11·00	12·84
Wirrabara	2·45	30·05	17·06	18·91
Appila	1·18	18·32	12·93	15·08
Cradock	1·25	17·37	9·32	10·86
Carrieton	1·96	21·18	9·44	12·22
Johnburg	1·96	17·51	8·57	10·21
Eurelia	1·45	21·15	11·23	13·24
Orroroo	2·11	21·34	11·53	13·42
Black Rock	1·63	20·02	10·45	12·25
Petersburg	1·82	20·37	10·96	13·07
Yongala	2·20	22·89	11·99	13·94
NORTH-EAST.				
Ucolta	1·72	16·75	—	—
Nackara	1·38	16·66	8·15	—
Yunta	1·52	16·64	7·08	8·22
Waukaringa	1·23	13·81	6·73	7·94
Mannahill	0·95	11·97	6·94	8·46
Cockburn	1·18	12·27	6·55	7·97
Broken Hill, NSW	1·08	14·18	8·10	9·63
LOWER NORTH.				
Port Pirie	2·64	17·55	12·67	13·21
Port Broughton	2·07	16·43	14·80	14·33
Bute	2·42	21·51	14·01	15·42
Laura	2·63	23·93	16·19	18·22
Caltowie	2·25	21·20	14·93	17·27
Jamestown	3·05	24·54	18·24	17·46
Gladstone	3·11	22·69	13·99	16·00
Crystal Brook	2·76	20·85	13·89	15·62
Georgetown	3·70	27·07	16·12	18·32
Narridy	2·95	20·89	14·63	16·79
Redhill	3·48	23·32	14·93	16·79
LOWER NORTH—*continued*.				
Spalding	3·96	27·63	17·23	20·25
Gulnare	3·68	26·28	16·26	19·74
Bundaleer W. Wks.	4·21	27·11	14·81	17·29
Yacka	3·33	32·35	13·46	15·27
Koolunga	3·88	23·64	13·94	15·94
Snowtown	2·57	22·32	17·58	15·70
Brinkworth	3·34	24·04	14·39	15·48
Blyth	2·57	24·72	14·61	16·34
Clare	3·55	36·37	21·90	24·30
Mintaro Central	4·06	40·18	20·15	21·99
Watervale	3·29	40·21	24·52	27·17
Auburn	3·50	35·73	21·00	24·25
Hoyleton	2·66	23·03	15·79	17·96
Balaklava	1·85	17·95	14·00	16·03
Port Wakefield	1·48	16·56	11·82	13·13
Terowie	2·21	19·25	11·49	13·71
Yarcowie	2·82	21·59	12·02	13·91
Hallett	2·82	20·33	14·12	16·40
Mount Bryan	3·21	21·10	14·25	15·73
Burra	3·37	23·15	16·01	17·82
Farrell's Flat	3·43	25·00	16·85	18·87
WEST OF MURRAY RANGE.				
Manoora	3·64	28·26	16·14	18·09
Saddleworth	3·27	25·96	17·49	19·69
Marrabel	3·58	24·83	17·11	18·94
Riverton	2·80	29·28	18·35	20·48
Tarlee	2·70	23·10	15·11	17·48
Stockport	3·59	23·67	14·33	15·89
Hamley Bridge	1·76	18·96	14·60	16·45
Kapunda	2·82	24·88	17·71	19·67
Freeling	1·68	20·93	15·93	17·85
Greenock	1·35	25·72	21·21	21·46
Truro	2·40	27·83	17·86	19·74
Stockwell	2·70	25·15	16·95	20·30
Nuriootpa	2·38	24·20	18·81	21·25
Angaston	2·55	28·57	19·95	22·25
Tanunda	2·12	25·90	20·05	22·28
Lyndoch	2·25	28·08	20·56	23·01
Williamstown	2·28	—	—	—
ADELAIDE PLAINS.				
Mallala	1·68	17·18	14·89	16·88
Roseworthy	1·85	20·52	15·49	17·31
Gawler	2·29	23·03	17·20	19·21
Two Wells	0·87	14·08	14·42	16·36
Virginia	1·67	20·04	15·53	17 58
Smithfield	2·18	22·19	15·08	17·30
Salisbury	1·77	23·51	16·49	18·57
North Adelaide	2·28	31·91	20·28	21·49
Adelaide	2·08	26·71	18·93	21·04
Brighton	2·28	36·96	18·68	—
Glenelg	1·51	24·81	16·34	—
Magill	2·75	35·69	22·69	19·93

RAINFALL—*continued.*

Station.	For Oct., 1917.	To end Oct., 1917.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
ADELAIDE PLAINS—*continued.*				
Glen Osmond ...	2·55	37·43	22·89	25·26
Mitcham	2·70	31·00	21·22	23·47
Belair	3·10	—	25·76	28·64
MOUNT LOFTY RANGES.				
Teatree Gully....	2·44	38·58	24·78	28·19
Stirling West ...	4·28	68·57	42·26	46·70
Uraidla	3·94	65·22	40·19	44·35
Clarendon	2·69	41·06	30·15	33·67
Morphett Vale ..	1·99	29·24	19·52	23·32
Noarlunga	1·70	27·52	18·17	20·28
Willunga	2·13	33·46	23·53	25·98
Aldinga	2·06	28·32	18·04	20·34
Normanville	2·18	26·32	18·74	20·65
Yankalilla.......	2·68	31·80	32·58	22·78
Cape Jervis	—	—	—	16·34
Mount Pleasant .	3·14	39·52	24·44	26·87
Blumberg	2·80	43·62	26·55	29·38
Gumeracha	3·97	49·13	29·34	33·30
Lobethal	4·75	46·02	32·19	35·38
Woodside	4·18	45·24	28·93	31·87
Hahndorf	3·58	46·44	31·61	35·45
Nairne	3·91	40·11	25·83	28·83
Mount Barker ...	3·94	47·96	28·19	30·93
Echunga	2·98	47·92	29·89	32·83
Macclesfield	2·97	39·18	27·65	30·72
Meadows	3·37	52·84	32·28	35·52
Strathalbyn	2·19	22·71	17·41	19·28
Myponga........	2·55	—	—	—
Millbrook Reservr.	3·83	—	—	—
MURRAY FLATS AND VALLEY.				
Wellington	1·86	16·06	13·14	15·01
Milang	1·34	14·49	14·03	16·08
Langhorne's Brdg	1·44	—	—	15·27
Tailem Bend	1·90	17·29	12·75	—
Murray Bridge ..	2·30	14·00	12·42	14·32
Callington	2·74	18·49	13·83	15·65
Mannum	1·82	11·35	10·32	11·67
Palmer	2·08	18·79	12·97	15·60
Sedan	2·30	15·17	10·76	11·92
Blanchetown	1·81	6·58	9·81	—
Eudunda........	3·20	19·74	15·47	17·33
Sutherlands	3·16	11·97	9·32	10·71
Morgan	2·58	9·56	7·74	10·60
Overland Corner .	2·65	12·01	9·42	—
Renmark	2·56	15·16	9·09	11·42
Loxton	2·32	17·21	9·15	10·93
Swan Reach	1·49	—	—	—
Waikerie........	2·24	—	—	—
WEST OF SPENCER'S GULF.				
Eucla..........	0·78	10·32	8·80	10 13
White Well......	0·19	10·26	7·85	9·67
Fowler's Bay ...	0·44	15·79	11·19	12·11
Penong	0·69	15·67	10·37	11·93
Murat Bay	0·39	13·71	9·40	—
Smoky Bay	0·85	13·74	—	—
Streaky Bay.....	0·82	19·56	14·00	15·31

Station.	For Oct., 1917.	To end Oct., 1917.	Av'ge. to end Oct.	Av'ge. Annual Rainfall
WEST OF SPENCER'S GULF—*continued.*				
Port Elliston	1·22	23·16	15·10	16·49
Port Lincoln	2·80	19·01	16·24	19·88
Tumby Bay	1·82	18·03	13·97	15·00
Carrow	2·53	24·67	—	—
Cowell	0·74	11·79	—	11·76
Point Lowly......	2·31	13·76	10·18	12·21
Cummins	1·98	—	—	—
Arno Bay	0·84	—	—	—
YORKE'S PENINSULA.				
Wallaroo.........	1·83	16·63	12·80	14·05
Kadina..........	2·50	21·89	13·49	15·88
Moonta	1·25	19·27	14·21	15·22
Green's Plains ...	2·06	20·04	14·36	15·73
Maitland	1·13	26·71	18·34	20·08
Ardrossan	1·58	16·12	12·56	13·89
Port Victoria ...	1·27	20·88	13·86	15·21
Curramulka	2·06	22·07	16·92	18·50
Minlaton	1·75	26·00	16·03	17·41
Stansbury	1·75	26·27	15·54	17·06
Warooka	1·71	26·63	16·22	17·71
Yorketown	1·00	23·65	15·77	17·47
Edithburgh	1·45	23·14	14·98	16·48
SOUTH AND SOUTH-EAST.				
Cape Borda	3·29	29·01	23·09	25·09
Kingscote	1·72	24·32	17·15	18·95
Penneshaw	2·22	21·98	19·56	21·34
Cape Willoughby..	—	—	17·71	19·69
Victor Harbor ...	3·11	25·47	19·64	22·18
Port Elliot	2·49	23·76	18·04	20·33
Goolwa	2·47	22·56	15·01	17·93
Pinnaroo	2·20	16·70	13·29	16·74
Parilla	2·48	16·38	—	—
Lameroo	2·26	17·28	14·31	16·55
Parrakie	2·23	16·39	12·42	—
Geranium	2·62	19·75	12·95	—
Peake	2·24	19·24	14·06	—
Cooke's Plains ..	2·23	19·65	13·09	14·74
Meningie	2·02	22·65	—	—
Coomandook	2·49	22·92	15·40	16·80
Coonalpyn	2·62	23·21	15·46	17·49
Tintinara	3·19	23·60	16·13	18·78
Keith...........	1·85	21·73	15·99	—
Bordertown	2·60	23·67	17·05	19·76
Wolseley	3·01	23·43	15·74	17·72
Frances	2·24	21·09	17·69	20·74
Naracoorte	2·62	25·86	19·98	22·60
Penola	2·78	30·33	22·51	26·78
Lucindale	2·38	26·52	20·48	23·32
Kingston........	2·90	30·20	21·95	24·73
Robe	3·12	28·52	22·37	24·69
Beachport.......	2·67	28·87	24·87	27·51
Millicent	3·23	32·15	26·53	29·25
Mount Gambier .	3·59	32·12	28·08	32·00
C. Nrthumberland	—	—	34·54	26·63
Kalangadoo	4·01	—	—	—

AGRICULTURAL BUREAU REPORTS.

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Arden Vale & Wyacca	340	—	—
Arthurton	*	—	—
Balaklava	*	—	—
Beaufort	*	—	—
Beetaloo Valley	342	26	—
Belalie North	340	24	22
Berri	*	28	—
Blackheath	360	24	—
Blackwood	361	19	17
Blyth	*	21	—
Bookpurnong East	360	—	—
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Borrika	349-60	—	—
Bowhill	*	—	—
Brentwood	*	—	—
Brinkley	*	24	—
Bundaleer Springs	341	—	—
Burra	*	—	—
Bute	345	—	—
Butler	‡	—	—
Caltowie	*	—	—
Canowie Belt	*	—	—
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Carrow	349	—	—
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Clanfield	360	—	—
Clare	*	—	—
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Dawson	*	—	—
Denial Bay	*	—	—
Dowlingville	*	—	—
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Elbow Hill	†	—	—
Eurelia	*	—	—
Forster	*	—	—
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Ironbank	*	—	—
Julia	*	—	—
Kadina	*	—	—
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Ki Ki	*	—	—
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Mount Gambier	*	—	—	Strathalbyn	365	27	—
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Mundoora	343	—	—	Tintinarra	*	—	—
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Myrla	*	—	—	Warcowie	340	—	—
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*No report received during the month of October. † Formal report only received.
‡ Held over until next month.

THE AGRICULTURAL BUREAU OF SOUTH AUSTRALIA

Every producer should be a member of the Agricultural Bureau. A postcard to the Department of Agriculture will bring information as to the name and address of the secretary of the nearest Branch.

If the nearest Branch is too far from the reader's home, the opportunity occurs to form a new one. Write to the department for fuller particulars concerning the work of this institution.

REPORTS OF BUREAU MEETINGS.

UPPER-NORTH DISTRICT.

(PETERSBURG AND NORTHWARD)

CARRIETON (Average annual rainfall, 12.22in.).

October 11th.—Present: seven members and one visitor.

Sheep on the Farm.—The Chairman (Mr. W. T. Brown) contributed a paper on this subject, in which he said every farmer should endeavor to keep at least from 50 to 100 good breeding ewes. To make a success of the lambing large paddocks should be subdivided. He favored the Merino ram, and stated that he should be from two to three years old, with large frame, good length of staple, and not too much grease. The rams should be mated in November, and that should give a good lambing in March and April. The report of the delegates to Congress was also received and discussed.

COOMOOROO (Average annual rainfall, 11in. to 12in.).

October 27th.—Present: seven members and one visitor.

Breeding Stock on the Farm.—A short paper dealing with this question was read by Mr. E. Brice, who said that a good sound stallion should be selected if one intended to build up a good type of farm horse. The mare should be mated in order to foal during August and September, as at that time there was usually an abundance of good feed. The ram should not be allowed to run with the flock all the year, and the sheep should have a frequent change of pastures. The cows should be managed on a system that would allow each animal to come in at regular intervals. One sow, if properly attended to, should provide the homestead with bacon.

MORCHARD (Average annual rainfall, 11in. to 12in.).

September 5th.—Present: 12 members and 14 visitors.

Disk v. Share Plough.—A paper on this subject was read by Mr. H. A. Toop, in which he said it was not always wise to burn the stubble unless it was done for the express purpose of cleaning the land. With a disk implement the straw could be ploughed in without any trouble, and would prove valuable in that it would keep the land from setting down hard. Being very light in draught 10 horses could comfortably work an implement cutting 7ft., while with the share plough the same number of horses could only work a machine cutting 4ft. 6in. With a 7ft. disk one man would be able to plough 10 acres a day, which was an important item at present, on account of the shortage of labor.

Care of Netting Fences.—A paper on this subject was contributed by Mr. R. L. Bates, who said that a good plan when effecting repairs to wire netting fences through which rabbits were getting was to dig a trench say 12in. to 18in. deep, and then tie a piece of netting, long enough to make a flap, on to the bottom of the netting of the fence, which should be covered by a layer of earth and stones. The gates in the fences should also be kept in good order, as unless they were attended to the rabbits from adjoining land would have free access to the paddocks, and the repairs made to the fence would have been so much waste time.

QUORN (Average annual rainfall, 13.78in.).

October 22nd.—Present: six members and four visitors.

Wheat Best Suited for District.—Mr. A. F. Noll, in a short paper dealing with this question preferred early varieties of wheat, such as King's Early and Gluyas for hay, and for later hay Dart's Imperial or Marshall's No. 3. Federation and King's White were given preference as the best harvesting wheats. Mr. Brewster, in discussing the paper, did not favor Gluyas on account of its tendency to go down. Mr. Schnell considered Yandilla a better hay wheat than Federation. Mr. Easther gave preference to Golden Drop. The chairman thought it was a good plan to mix various wheats for hay.

WARCOWIE (Average annual rainfall, 12.16in.).

September 29th.

Co-operation.—Mr. T. Ryan, in the course of a paper dealing with the subject of co-operation amongst farmers, mentioned that the drain which the farming community had suffered through enlistment made it difficult for them to carry on their farming operations. The way to meet the difficulty was for farmers to assist each other. The difficulty was for the farmer to secure that little assistance just at the time it was required. He suggested that the connection of the different farms with the telephone would be of service. Such means of quick communication would enable them to obviate the frequent happening of two or three neighbors making a journey for mails, &c., whereas one could have done the necessary business. He thought the Government should assist in the installation of the services.

AMYTON, October 2nd.—The delegates to the annual Congress (Messrs. Crisp and Mills) tendered their report of the proceedings, which was well discussed.

AMYTON, October 9th.—The Veterinary Lecturer (Mr. F. E. Place) delivered an address on "Mares in Foal and Foaling." The Acting Secretary of the Advisory Board (Mr. H. J. Finnis) was also present, and delivered an address on "The Working of the Agricultural Bureau."

ARDEN VALE and WYACCA, October 1st.—A discussion took place on the report of the delegates to the Annual Congress.

COOMOOROO, September 29th.—The Hon. Secretary (Mr. W. Robertson), delegate to the Annual Congress, delivered a report of the proceedings.

MOUNT REMARKABLE, October 12th.—The Superintendent of Experimental Work (Mr. W. J. Spafford) visited the Branch, and delivered an address on "Cultivation."

TARCOWIE, October 2nd.—In a short paper on "Pig Breeding in Connection with Mixed Farming," Mr. D. Butterick said that if cows were kept on the farm, and the pigs properly cared for, they would bring in good returns. One should keep three good sows, and only have the services of a pure-bred boar. The young pigs should be well fed, but not to such an extent that there was always stale food left in the trough. The animals should have a small paddock sown with barley, which, besides providing them with feed, would enable them to have exercise. Occasional meals of charcoal were also recommended.

WEPOWIE, October 6th.—The meeting took the form of a discussion on the report of the delegates to the Annual Congress.

WILLOWIE, October 9th.—The delegates to the Annual Congress presented their reports, which brought forward a good discussion.

MIDDLE-NORTH DISTRICT.

(PETERSBURG TO FARRELL'S FLAT.)

BELALIE NORTH (Average annual rainfall, 16in. to 17in.).

August 4th.—Present: seven members.

Closer Settlement.—Mr. Bradtke in a paper under this heading, said he would take as an example a holding of 600 acres. Two hundred acres could be fallowed, 200 for crop, and 200 acres grass land. That would mean each 200 acres would be cropped every third year. Ploughing should be done to a depth of about 4in. during the months of June and July. The weeds could be kept down by cross-harrowing and cultivating. Ten acres each of barley and oats could be sown as feed for stock. In discussing the paper Messrs. Warner and O'Leary both thought seeding should be commenced in May, and Mr. Gullidge said fallowing to a depth of 2in. was deep enough.—At a further meeting, held on September 1st, at Mr. W. Cummings' residence, various veterinary questions were discussed.—Mr. Bradtke, at a meeting held on September 29th, delivered a report of the proceedings at the recent Congress.

BOOLEROO CENTRE (Average annual rainfall, 15.83in.).

September 28th.—Present: seven members.

Machinery at the Adelaide Show.—Under this heading a paper was contributed by Mr. F. D. Brooks, who said that the price of practically every farming implement had greatly increased since the commencement of the war. He had noticed a seed fertilizer drill and skim plough combined, and thought that where there was only one man on the farm a great saving of time and labor would be effected. A machine constructed with a large revolving knife for cutting mallee shoots was also noticed. In many cases a great waste of stable manure occurred, as the refuse was simply carted out in heaps and left in the paddocks. A machine was now obtainable which enabled one to evenly distribute the manure from the back of a dray or wagon. Elevators for placing hay on the top of high stacks were also noticed. He considered that good progress had been made with regard to farm traction engines, and thought the time not far distant when they would, to a large extent, take the place of horses on the farm.

BUNDALEER SPRINGS.

September 26th.—Present: 10 members and one visitor.

Mr. J. A. Gerke opened a discussion on "Noxious Weeds," in which he referred to docks and wire weeds, the latter being a nuisance in the false comb at harvest time. Mr. O'Dea considered wire weed an excellent fodder for sheep in summer. In discussing the Noxious Weed Act be considered that the enforcing of the Act by the Government would mean the ruination of many landholders. Mr. A. Lawrie said that apart from the fact that the Noxious Weed Act obtained it behoved every landholder to keep his property clear of undesirable weeds. Mr. Ellis regarded the wild turnip as the worst weed the farmer had to contend with in his crops.

CRYSTAL BROOK (Average annual rainfall, 15.62in.).

September 29th.—Present: 21 members.

Seeding.—Under this heading a paper was contributed by Mr. J. Greig. If the fallow had been worked since harvest and was in a good clean condition, he said, the cultivator need not be worked very deeply, but if, when worked, the land broke up into clods, it should be well harrowed to prepare a good bed for the seed. A good time to commence seeding was about the first week in May. He did not think it wise to commence seeding too soon after rain had fallen, but a week or so should elapse to enable any weeds to germinate. If the land was at all sticky and the drill did not cover the seed too well a set of harrows should be run over the ground. Various quantities of wheat could be sown, but he preferred drilling about one and a third bushels of early wheats and one bushel of later varieties, with about 50lbs. of super. He did not think any advantage could be obtained by pickling if the soil was dry. He favored the method of pickling on the floor, as every grain had a better chance of being treated.

MINTARO.

September 1st.—Present: 18 members and one visitor.

Care of Farm Implements.—Mr. E. J. Lattorff read a short paper on this question, in which he advocated plenty of shed accommodation for the storage of farm implements when not in use. All nuts should be kept tight, and the machines, wagons, drays, &c., given a coat of paint at least once a year, as that would preserve the woodwork.

MINTARO.

September 29th.—Present: 15 members and seven visitors.

Homestead Meeting.—The meeting was held at Mr. Trelawney's residence, when a paper on "The Most Profitable Sheep for the Farm," contributed by Mr. D. Brown, was read by the Hon. Secretary (Mr. E. A. Scarfe). The writer gave first place to the Merino. The Merino ewe for lamb-raising should be mated with the Dorset Horn ram for the production of lambs. In comparing the direct value of the Merino-Dorset cross and the Lincoln breed of sheep the difference would be very noticeable at shearing time, when the superiority of the Merino wool would compensate the owner for the difference in the lambs. In the discussion which followed Mr. Kelly said the Shropshire cross was a fast grower, and carried its meat well. He intended trying the Leicester-Merino cross, however, one that he thought would consume the least food, and return the greatest value in both wool and meat. Mr. Sandow expressed a preference for the Lincoln-Merino cross. Mr. Thomas advocated the Shropshire-Merino. Generally, members agreed with the opinions of the writer of the paper.

NARRIDY (Average annual rainfall, 16.79in.).

September 1st.—Present: 13 members.

Weighing Wheat in Bulk.—The Hon. Secretary (Mr. J. Darley) contributed a paper in which he mentioned as his object an endeavor to improve the position of the farmer with regard to weighing and handling wheat at railway stations, by the substitution of the weighbridge system for that at present in vogue. It had been stated that weighbridges were liable to get out of order, but his view was that the scales were just as liable to be faulty, and he detailed instances in which the scales had been responsible for incorrect weighings. He estimated the cost of putting in bridges on this side of Spencer's Gulf at 90 principal stations at £20,000. A charge of one-tenth of a penny per bag would pay the upkeep and interest and provide a small sinking fund. The cost of the present system, he said, was ¼d. a bag. He then quoted the experience of Victoria, where it was stated there was a weighbridge at nearly every station or siding, either put down by the Government or co-operatively by the farmers. Attention was also directed to the fact that farmers were not given a receipt showing the weight of the individual bags delivered and weighed over the scales in this State, consequently they were not in a position to check the computation of the agents. Members unanimously agreed with the views expressed by the writer of the paper.

PORT BROUGHTON (Average annual rainfall, 14.44in.).

September 7th.—Present: nine members.

Rabbit Destruction.—After naming the various methods used in the destruction of rabbits, Mr. T. Pattingale, in a paper entitled "Rabbit Destruction," said that unless stringent steps were soon taken to rid the district of the increasing number of rabbits there would be a serious depreciation in next year's harvest. In discussing the paper Mr. Whittaker said he had obtained best results from the use of bisulphide of carbon. The Hon. Secretary (Mr. J. Fletcher) favored the plan of ramming an old super. bag in the holes, but thought that digging the burrows out was more destructive.

YACKA.

September 26th.—Present: 10 members.

Mixed Farming.—Mr. R. Fuller contributed a short paper on this subject, in which he confined his remarks to those farms where wheat-growing was the chief object. To achieve the best results the land should be worked thoroughly. Sheep should be combined with wheat-growing, not only because of the wool, lambs, and meat that they supplied, but also because of the good they did to the land. Cows, poultry, and pigs should be kept, and a garden to provide enough vegetables for household consumption. The President (Mr. A. O. Badman) also gave a short address on the business conducted at the Congress.

BEETALOO VALLEY, September 24th.—Mr. Flavel gave a report of the Congress meetings, and a good discussion followed.

MOUNT BRYAN EAST, September 22nd.—The meeting took the form of a concert and sale of gifts, the proceeds of which were devoted to the Wounded Soldiers Fund. The meeting was well attended, and the Branch was able to subscribe £22 to the fund.

MUNDOORA, October 1st.—The report of the delegates to the Congress was received, and members discussed the papers on "Fox Destruction," and "Noxious Weeds."

NORTH BOOBOROWIE, July 25th.—ANNUAL MEETING.—At the conclusion of the business of the Branch the Horticultural Instructor (Mr. G. Quinn) gave a demonstration in pruning, and in the evening delivered an address on "Beautifying and Sheltering Farm Homesteads."

REDHILL, September 25th.—A paper on the "Marketing of Wheat" was contributed by Mr. W. Pengilly, which was well discussed.

WHYTE-YARCOWIE, September 24th.—Messrs. E. J. Pearce and G. D. Mudge (delegates to the Annual Congress) gave their report of the proceedings, which was well discussed.

WIRRABARA, September 29th.—Mr. C. H. Borgas contributed a paper in which he dealt with the principles of hay-making.

LOWER-NORTH DISTRICT.

(ADELAIDE TO FARRELL'S FLAT)

LONE PINE.

October 8th.—Present: 20 members and five visitors.

Mr. E. Minge contributed a paper on "Planting Vines," in which he stated that as vines required a good deal of moisture they should be planted in deep sandy land, with a moist clay subsoil. The land should be worked as evenly as possible, and if necessary the roller run over it. Vines could be planted either in holes or in trenches. The holes should be sunk to a depth of 12in., and be a foot square. The latter method was performed by working a single-furrow plough a foot deep along the line, then planting the vines and ploughing the soil back into the furrow. Only the best and healthiest vines should be planted. The roots should be trimmed back to a length of 2in. or 3in. A small quantity of bonedust should be put in each hole and covered with a thin layer of earth, as it was not wise to allow the roots of the vine to come into contact with the manure.

SALISBURY (Average annual rainfall, 18.57in.).

October 2nd.—Present: 17 members and two visitors.

THE BREEDING AND FATTENING OF LAMBS.—In a paper dealing with this question Mr. F. H. Weston said—"The Merino always will be the sheep for our great pastoral runs and for large holdings generally, but for the farmer on small holdings the breeding of Crossbreds will generally be found more profitable. Personally I am in favor of a first cross, although a Lincoln-Merino or a Leicester-Merino ewe is a better mother than the Merino. Against this the Crossbred ewe is generally bad for fences. The farmer is often tempted to keep some of the ewe lambs for breeders, thus getting a second or perhaps a third cross, which means a very uneven breeding flock with many grades of wool, which if not properly classed is sold at a disadvantage. Some years ago there were practically only two breeds known in South Australia, viz., the Merino and the Lincoln. To-day we have, in addition to these two breeds, the Leicester, the Border Leicester, Shropshire, Southdown, Dorset Horn, and Romney Marsh, all good useful sheep for crossing with the Merino. The Lincoln is about the biggest of all British breeds, and grows a heavy fleece; but it should be borne in mind that a big sheep requires richer pastures than a smaller breed. The Lincoln-Merino lamb is inclined to be somewhat rough and ragged looking, and seems to grow too much wool to fatten readily, and in my opinion the Lincoln should only be used when there is a plentiful supply of rich feed. The Leicester, Shropshire, or Southdown will get a more nuggetty and quicker fattening lamb than will the Lincoln. The Romney Marsh is a most useful sheep for this purpose, and for wet exposed land I doubt if this sheep has an equal. Whatever breed is decided on I would strongly recommend getting pure-bred sires, not necessarily high-class sheep, but of pure descent. It has long been recognised among experienced breeders that a pure-bred sire is more likely to transmit good qualities to his progeny than a sire that is not so well bred. Of whatever breed, the sire should be of good shape; he should stand square on his legs, which should be wide apart, prominent brisket, well sprung ribs, straight back, full legs, and not too large a head. In Shropshires choose the ram with a clean face, wool blindness is a great drawback to lambs, and they are generally the last to be ready for market. In breeding market lambs avoid over stocking. A plentiful supply of feed is necessary for the rearing of good lambs; no ewe of whatever breed can grow a fleece and rear a good lamb on a scanty supply of feed. The time of lambing must be decided by local conditions, no doubt early lambs do the best provided the ewes have green feed from the start; but if they lamb on dry feed the flow of milk is small, and consequently the lamb gets a bad start, from which it never thoroughly recovers. Lambs should never be allowed to have a check from the time they are dropped, or, as English breeders say, 'their first fat should be kept on them.' The ewes at mating time should be in strong condition, but not over fat. There is a practice in England of flushing the ewes, that is, in putting them on better feed for two or three weeks before putting the rams with them; this stimulates them, and helps to bring them on rutting, which means a quicker lambing and a more even drop of lambs. An occasional change of pasture is beneficial, a fresh paddock, even if the feed is no better, is relished by the sheep, and they will thrive better than if kept constantly in the one paddock. In breeding lambs for market a standard of excellence should be aimed at, as a lamb of first-class quality will always bring a considerably better price than the medium one, and at anything like present prices sheep are certainly worth the best attention one can give them. Opinions differ as to the best age to put the Merino to any of the British breed of rams; many experienced men hold that it is best to get ewes that have already reared two or three lambs, while others are in favor of getting maiden ewes, say, four-tooths. There is something to be said on both sides of the question—the older ewe should have less trouble in lambing; on the other hand the young ewe is generally stronger, and throws a smaller lamb, while her bone is more flexible than in the older ewe; but of whatever age they should be well grown and roomy. One cannot expect a well matured, thriving lamb from a weedy ill-bred ewe. To get a fairly quick lambing the ram should not have more than 50 to 60 ewes. Some breeders give the ram up to 100 ewes, but that necessitates leaving the ram in a longer time, and also means a prolonged lambing. A careful husbandman will examine the udder of each ewe before putting her to the ram. Any ewe with a faulty udder or a blind teat should be culled and sent to the butcher.''

WATERVALE (Average annual rainfall, 27.17in.).

September 24th.—Present: eight members.

ONION-GROWING.—To obtain good results, said Mr. J. Halls, in a paper dealing with onion-growing, one should first of all procure clean, tested seed. The land should be worked in January, and harrowed down to a fine tilth. The seeds should be planted not later than the third week in April. A little sand and manure mixed with the soil would help it to retain moisture, and also prevent a hard crust from forming on the surface. The young plants should be ready to transplant about three months from the time at which they first showed above the surface of the ground. He would not transplant before the end of June, because if strong plants were put in early they would either develop too much top, or the bulb would not form properly. They should be put in rows not closer than 9in., with 4in. between the plants. Hoeing was better than using the small cultivator, as the soil in that district was inclined to set hard on the surface. The plants would be ready to pull when the tops commenced to dry off. They should be left on the ground in rows four or five deep to dry off, care being taken to keep the sun off the bulb. They should be stored in a cool dry place.

LYNDOCH, September 27th.—Mr. S. C. Davis, of the Rosenthal Branch, attended the meeting, and gave a paper on the "Bulk Handling of Wheat." In the discussion that followed members generally agreed with the views expressed by the writer in the paper.

LYNDOCH, October 25th.—A discussion took place on "Noxious Weeds," and Messrs. Moore and Hammatt gave a report of their attendances at the last Annual Congress.

NANTAWARRA, September 27th.—Mr. A. F. Herbert contributed a paper on a trip to Renmark, in which he described the class of country passed through. The report of the delegates to the Congress was also received.

YORKE PENINSULA DISTRICT.

(TO BUTE.)

BUTE (Average annual rainfall, 16.61in.).

October 1st.—Present: 16 members and four visitors.

HOMESTEAD MEETING.—The monthly meeting of the Branch was held at Mr. A. Tilley's residence. A paper on "Farm Accounts" was contributed by Mr. A. J. Hughes, who said that with the ever increasing costs of production and the limited prices of products it was very necessary to ascertain which branch or sideline of the farm was showing a profit or loss, and that could only be done by a system of bookkeeping. A set of books should be opened; those required would be a ledger, to contain all the transactions of the farm under their different accounts, *i.e.*, capital, plant, stock, land and improvements, repairs and maintenance, seeding, harvesting, wages, &c., and all other expenses. The day book should contain a daily record of every transaction as it occurred.

MOONTA (Average annual rainfall, 15.22in.).

July 7th.—Present: 16 members and one visitor.

MAINTENANCE OF MAIN ROADS.—A paper under this heading was read by Mr. W. B. Stacey, and the following discussion took place. Mr. J. Atkinson thought that if they had the necessary money, better roads could be made, but material was much more expensive at the present time. Mr. W. F. Ortloff said there was too much oxidized material used, and thought that if good rubble was used better results would be obtained. Mr. A. B. Fergusson said good roads could be made from good screened rubble if it were properly rolled in. Mr. W. Edage thought that a good side track along the side of the main road would save the metal a lot of wear and tear, and would not be so hard on the horses' feet. A few pounds spent in clearing a side track would save pounds in the maintenance of metal roads. At a further meeting, held on October 3rd, the report of the delegates to the Annual Congress was received and discussed.

MOONTA, September 1st.—A paper was read by Mr. T. Williams, in which he dealt with the various diseases of the horse.

WESTERN DISTRICT.

EDILLILIE.

September 29th.—Present: eight members and two visitors.

MIXED FARMING.—In a paper dealing with this question, the Hon. Secretary (Mr. J. F. Carter) said that in outlining his ideas of the most economical method of conducting mixed farming he would assume that the land was practically cleared of bushes and subdivided with sheep-proof fences into small paddocks. Cropping one-quarter of the farm each year would give a four-course rotation of bare fallow, cereals, and pasture for two years. Of the area cropped he would sow one-third each of oats, wheat, and malting barley. The oats were necessary for hay, and in addition provided a change of crop for the soil. When the first paddock so sown came again under crop, which would be in four years' time, the oats should be sown on the barley land, wheat where the oats had previously been sown, and the barley on the wheat land, thus giving a change of crop to each section of land. Of the two paddocks under pasture, the paddock standing out for the first year would carry about one sheep to two acres, and the second paddock one sheep to four acres. Should fodder crops be grown in addition, the stock-carrying capacity of the land would be increased. Other sidelines, such as dairying and pig-raising, were profitable, but when one considered the difficulty of procuring and the expense of paying for competent hired labor, and the limited local demand for pork, he thought sheep would prove the most remunerative and interesting sideline.

GREEN PATCH (Average annual rainfall, 26.56in.).

September 24th.—Present: seven members.

Summer Fodders.—Mr. E. M. Sage contributed a paper on this subject, and said one should first of all consider what class of stock was to be fed. One growing fodders for sheep or to fatten cattle would have a wider range of plants to choose from than one who was in the dairying industry. The best fodders for cows were sorghum, maize, and millet. These were purely summer fodders, and if fed there would be no fear of having tainted milk, but care should be taken to see that these grasses were securely fenced, as sorghum in certain stages of its growth was poisonous. Those crops were also useful to the sheep farmer, and they could be grazed equally as well and without any waste. He had grazed with sheep a 6ft. crop of Early Amber Cane, and in June had been able to harrow in Cape barley without any trouble. Soils that were easily kept loose and open on the surface were the best on which to grow summer fodders, but soils that, after rain had fallen on them ran together, were not likely to prove very satisfactory. As turnips or kale should only be lightly covered it was necessary to sow them at the beginning of September. Sowing should be done when the soil was damp on the surface or when rain was likely to fall soon after sowing. Rape was a very uncertain crop to sow in spring as it was subject to blight, which would completely ruin a good crop. Maize should be sown about 4in. deep, and sorghum as deep as the drill would work. A good plan was to mix the seed with the manure—guano for preference—and sow through every fourth hoe, making the rows 28in. apart, but with the manure running through all the hoes. If mineral super was used the seed should be sown at once. Mr. E. E. Chapman also spoke, and gave a report of the Annual Congress.

KOPPIO (Average annual rainfall, 22.40in.).

October 1st.—Present: seven members.

Improving the Farm Flock.—The Chairman (Mr. C. F. Richardson) in reading a paper dealing with this question, said that sheep would eventually prove more profitable than wheat-growing in that district. The many local difficulties and the risk of the wheat market, increasing cost of super., cornsacks, and machinery all tended to make the production of wheat a very hazardous undertaking. As regards the type of sheep best suited to the requirements of the district, he favored the use of a ram of one of the long-woolled British breeds, such as the Lincoln, Leicester, or Romney Marsh, crossed with a Merino ewe. From that cross one would have a large shapely sheep, carrying a good fleece. They were quiet and tractable, and took readily to hand feeding. During the year he had put some of the Crossbred ewes back to the Romney ram, and the lambs looked very promising, but it was not advisable to breed from the second cross, as that made the flock too mixed, neither was it advisable to put the Crossbred ewes back to the Merino ram for the same reason. The selection of the ram was an important factor, and if one desired to raise the standard of the flock, it should be seen that he came from a stud with a good reputation. The value of a good ram would be greatly discounted unless proper care and attention were devoted to the ewes. A few weeks before shearing they should be carefully examined and the broken-mouthed and badly-shaped ewes culled out. He would also see that the wool conformed with the type aimed at. The fleece should be even. Coarseness near the breech was a very prevalent fault. The best of the ewes should be earmarked for the Merino rams, and the others used for breeding Crossbreds. In that manner two flocks could be worked to advantage. It was better to use the older ewes for breeding Crossbreds, as the Crossbred lambs were usually bigger than Merinos, and the young ewes might have trouble in lambing to the British ram. As to the time for lambing, his experience had been that May was about the best month. A walk round the lambing ewes every day often prevented trouble and the loss of ewes and lambs.

MILTALIE (Average annual rainfall, 14.55in.).

September.—Present: nine members and one visitor.

Homestead Meeting.—The meeting was held at Messrs. Story brothers' residence, when a paper on "Fruit Culture" was read by Mr. W. G. Smith. He said selection, cultivation, and pruning were the main principles in the production of fruit. When selecting the trees care should be taken to choose varieties that were suited to the climatic conditions of the district. He had planted some years ago, the following trees with good results:—Peaches—Louis Grognet, Triumph, Copas' early Red, and Briggs' Red May. Nectarines—Goldmine, Lord Napier, and Dr. Chisholm. Apricots—Newcastle Early, Riverside, Moorpark, and Royal. Plums—Clyman and Green Gage were good all-round plums, but were not suited to that locality, and he would recommend instead the Japanese hybrid plums, as follows:—Wright's Early, Climax, Burbank, and Federation. Apples—Cleopatra, Dunn's Seedling, and Jonathan. Pears—Bartlett, commonly known as "Duchess," a good all-round pear, but did not preserve well. Durondeau, a heavy cropper, and suitable to plant in conjunction with the Bartlett, as it was a good keeper. Quinces—Smyrna and Ray's Mammoth. Figs—White Provence, Brunswick, Grosse Verte, Turkey, and Madeline. Table Grapes—Muscat Gordo Blanco, Muscat Hamburg, Crystal, Sweetwater, and Lady's Finger. The departmental bulletin gave a select list of fruit trees and vines that would be found of valuable assistance in selecting trees. The ground should be broken up as deeply as possible, and subsoiled at least 12 months beforehand. When planting the trees, holes should be dug 18in. deep and 2ft. each way. All broken roots should be removed, the soil being packed firmly around the roots. The land should be well cultivated with the garden plough in order to obtain full benefit of the winter rains, and be then worked back with the harrows to conserve as much moisture as possible. When a tree was growing vigorously and not bearing too well, it should only be pruned lightly, but if not growing too well it should be cut back to reduce the number of wood buds, and have the laterals thinned out. One of the main factors to be observed in pruning was to keep the centre of the tree open in order to allow it to have plenty of sunlight. Should trees of from one to three years old be unevenly balanced, the heavy side should be pruned lightly, and the opposite side cut back to the strongest wood buds; that would encourage growth on the open or weak side. Summer pruning was a means of saving much waste energy and of checking the growth of misplaced laterals, and was also of great assistance in the shaping of young trees; but as a rule the mere pinching off with the thumb and forefinger of the points of the shoots was sufficient. Then at the winter pruning such shoots, if not required for fruiting, could be cut out. Should the garden not be situated in a sufficiently sheltered position a double row of some suitable shelter trees should be planted on the borders of the garden, and for that purpose he recommended almond trees, as they grew very quickly, and could also be used as a source of profit.

MILTALIE (Average annual rainfall, 14.35in.).

September 29th.—Present: 13 members and four visitors.

Homestead Meeting.—The meeting was held at Messrs. Story Bros.' residence, and a paper on "The Value of Native Birds to the Farmer" was contributed by the Hon. Secretary (Mr. W. E. Hier), in which he dealt with the great service the birds rendered the farmer in the destruction of the many insect pests that he had to contend against. Among others mentioned was the crow (which the writer of the paper thought of considerable service in destroying blowflies), the magpie, lark, willywagtail or shepherd's companion, tomtits, plovers, all of which were insectivorous. The ibis, which had lately made its appearance in the district, was of service in destroying mice. Members were generally agreed as to the usefulness of the birds mentioned, although Messrs. Bagnell and McEachern were disinclined to accept the crow as a friend. Mr. J. P. Story mentioned that if one crow were caught in a trap, and hung up, it would scare others away, and Mr. Hier said the same object could be attained by hanging the tops of kerosine tins so that they would be caused to knock together by the wind.

MINNIPA.

October 6th.—Present: eight members and nine visitors.

Cultivation and Growth of Lucerne.—Mr. E. J. Turley contributed a paper on this subject, and in reply to a question, said that 30cwts. per acre was a fair average yield of lucerne hay. He thought it was a suitable plant for that district, and without irrigation one could expect three cuts of green lucerne per year. As a general rule the life of the lucerne plant was about 20 years. He had not had experience with length of life of lucerne when only used for grazing purposes. Neither had he grown lucerne on pure white sand, but had grown good crops on stiffer soil than that in the Minnipa district. He considered it would be advisable to grow lucerne on land that was cultivated every three years, but pointed out that the plant was very hard to kill. He did not think that land water logged for two or three months of the year would kill lucerne as quickly as wheat, but emphasized the necessity for good drainage to obtain the best results.

MOUNT HOPE.

September 28th.—Present: seven members.

Harvester versus Stripper-Winnower.—In a paper under this title Mr. W. Mahoney, who had had experience with both methods of harvesting a crop, pointed out the advantages of the harvester over the stripper and winnower.

YADNARIE (Average annual rainfall, 14.09in.).

September 1st.—Present: 10 members and one visitor.

Extracts from a Note Book.—Under this title a paper was contributed by Mr. J. E. Quick, who dealt with various agricultural items. Members discussed them in the following order:—"Water Conservation"—Mr. J. Denholm, in opening the discussion, gave preference to narrow and deep dams. Mr. G. B. Kobelt considered that water conservation was the first and most important matter for the farmer. He did not think that couch grass would grow on the clay scooped up from the bottom of a dam, but if so it would no doubt assist in keeping dirt out of the dam. Mr. C. E. Stubing thought the square dam the best, as it would not be so hard to clean out. He preferred the drains deep and narrow, as with light rains there was more likelihood of catching water. Mr. F. W. Jericho did not consider a batter of 6in. to the chain sufficient in a drain. Mr. A. Spriggs preferred the dams to be narrow and deep, as it was in the bottom that the water would last longest. The wind could not play on the water and cause it to splash on the banks, thus taking up a great amount of water. Trial holes should be bored in preference to sinking with pick and shovel. "Varieties of Wheat"—Messrs. C. E. Stubing and G. A. Dreckow had grown Le Huguenot, but would not recommend it, as it did not suit that district. Mr. G. A. Dreckow thought that White Tuscan was not a good wheat for grain, but he could recommend it to members as a hay wheat. Mr. J. E. Quick stated that King's Red was a good wheat to stand rough weather. Mr. J. Denholm had obtained best results from Silver Bart. Mr. J. H. Kruger said Baroota Wonder was a bad wheat to shake out. White Tuscan was a splendid hay wheat, and horses appeared to like it better than most wheat. "Fallowing"—Mr. J. Denholm would commence fallowing soon after seeding as in his opinion the early fallowing was the best. He was not in favor of fallowing in September on account of the grass and weeds going to seed. He thought that instead of going on ploughing if one were to commence working back that which had already been fallowed in September more weeds would be destroyed. "The Advantages of Dehorning Cattle"—Mr. J. Denholm thought that it would be better to leave the cows with their horns, as they would have a better chance of protecting their offspring from dingoes, but thought the steers could be dehorned. Mr. A. Spriggs thought that it would be better to leave the horns alone, as a working bullock was practically useless in the scrub without them. The Secretary said that it was almost impossible to work a poley or dehorned bullock in the scrub, as one could not get them to face the timber. The horns prevented sticks from getting between the shoulder and the bow. "Poultry"—Mr. J. Denholm considered that the barndoor fowl was the most profitable for the farmer. Not only were they good layers, but were also a good utility fowl and could forage for themselves better than could the pure-bred fowl. Mr. A. Spriggs did not favor the heavy breeds. No doubt they were best for the table, but where the farmer had to reckon on fowls as an aid in keeping the house the lighter breeds were the best. He had noticed that where the hen stole her nest there was a larger percentage of chicks hatched than where a nest had been prepared. He considered it was the want of moisture that caused the chicks to die in the shells.—At a further meeting held on September 30th the Hon. Secretary (Mr. A. I. R. Carn) read an extract from the *Journal* entitled "How to Lay Out a Farm." Mr. J. H. Kruger, in opening the discussion, thought it was best to clear only a small portion of ground each year. That would enable one to keep the land clear of shoots and stumps. He was not in favor of having a trough in the stable yard. Messrs. G. E. Francis, A. Spriggs, and J. J. Deer also spoke in disfavor of the plan of having the trough in the stable yard.

CARROW, September 27th.—After the formal business of the Branch had been dealt with the report of the delegate to Congress was received and discussed.

SALT CREEK, October 6th.—The Hon. Secretary (Mr. W. Lee, jun.) read the paper dealing with "Noxious Weeds," which was given at the Annual Congress, and the report of the delegates was received and discussed.

YANINEE, September 29th.—The Congress papers dealing with "Rabbit Destruction" were read and discussed, and the Hon. Secretary (Mr. H. B. Scholz) delivered a report on the Congress. On October 1st members visited the Government Experimental Farm at Minnipa, and spent a very interesting and instructive afternoon.

YEELANNA, October 16th.—The meeting discussed at length the report tendered by the delegates on the Annual Congress recently held in Adelaide.

EASTERN DISTRICT.

(EAST OF MOUNT LOFTY RANGES.)

BORRIKA.

October 27th.—Present: 14 members and two visitors.

QUESTION BOX.—In reply to a question as to what wheats were most subject to takeall, Mr. H. S. Green stated that he had sown Yandilla King, Walker's Wonder, and Marshall's Prolific, and each variety had been affected. Mr. Hart mentioned that he noticed a paddock in which Budd's and Golden Drop had both been sown. The latter had been very badly affected, but the Budd's had not shown any sign. Mr. Hart said he had sown 45 acres, first drilling the wheat, then ploughing it in, and could not see any difference between it and that which had been ploughed first. In discussing the best method of destroying Lignum, Mr. Huxtable thought sheep would be able to keep this weed in check. Messrs. Hart and Bowden thought fallowing would destroy it. Messrs. E. N. Huxtable and Green each favored Yandilla King as the wheat best suited for that district.

CLAYPAN BORE (Average annual rainfall, 16in. to 17in.).

September 24th.—Present: eight members.

TIDINESS ON THE FARM.—In a paper dealing with this subject the Hon. Secretary (Mr. H. C. Colwin) said every farmer should, if possible, have sheds erected in which to house the implements and vehicles of the farm when not in use. He thought that the sheds should be roofed with straw, on account of the very high price of iron, and also because they were much cooler in the hot weather. Nothing gave the farm a worse appearance than broken down fences, and these could be kept in good order and repair if given a little attention when they first showed signs of wear. If farmers had a place for everything, and kept everything in its place, he felt sure that the farm would not look untidy. Mr. Robinson did not favor straw roofs on account of the danger of fires. Mr. Small said that all harness should be kept under cover when not in use, and he was in favor of having the water close to the stables. Messrs. Northcott, Gray, and J. Small also discussed the paper.

LAMEROO (Average annual rainfall, 16.55in.).

September 29th.—Present: 13 members.

Curing Pork.—Under this title a short paper was contributed by Mr. C. R. Eime. For curing pigs of about 140lbs. to 180lbs. he said, the pickle could be made of 8lbs. salt, 2 cups of brown sugar, 1 dessertspoonful of saltpetre, and 1 of allspice and mixed thoroughly. The mixture should be well rubbed into the hams. The steel should be run up the bones of the hams, and one or two pieces of saltpetre placed along the bone. The remaining pieces of meat should be well rubbed with salt and packed closely together in the cask. The bacon could be left in pickle for about 10 days, but it would take three weeks to thoroughly pickle the hams. The bacon, when taken out, should be well washed in clean cold water, and then thoroughly dry pressed for about 24 hours. The hams, when taken out of pickle, should be washed in cold water, placed in a tub, and have water never exceeding 90deg. temperature poured over them, then thoroughly dried, sprinkled with pepper, smoked, and finally hung in a cool dry place.

MANTUNG.

September 29th.—Present: seven members.

Fencing.—Under this heading a short paper was contributed by Mr. W. Stewart, who said that owing to the nature of the ground making the holes very difficult to sink he would place posts half a chain apart, with strainers every five chains apart. Posts should be placed 18in. in the ground, and the strainers 2ft. If the strainers were put in at correct distances it would be found to be very convenient for measuring the paddocks when working later on. Only the best timber should be used for the posts. By placing three galvanized wires below the bottom barb, and 5in., 11in., and 17in. apart, and one wire at 34in. from the bottom, between the two barbs, a good strong sheep-proof fence could be formed.

McNAMARA BORE.

Present: 11 members and one visitor.

Homestead Meeting.—The meeting of the Branch was held at Mr. H. Sanders' residence, when the opportunity was taken of inspecting the various crops. Later, Mr. Sanders read a paper dealing with "Fodder Crops in the Mallee," in which he said the raw state of the land in that district was a serious drawback to the growth of crops suitable for carrying a flock of sheep. If early winter feed were desired a mixture of rape, vetches, rye, and early wheat sown before the first rain, should give a fair quantity of feed before the stubble was at its best. For summer and autumn feed peas produced much feed of the best fattening quality, and at the same time increased the very small supply of nitrogen in that soil. Peas did well on land that had been cropped for two or three years and grazed for a year. A light ploughing about the end of May or the beginning of June was sufficient, although good results might be obtained with a much later sowing. If broadcasted they should be ploughed in, the harrows not being used, as they were liable to bring the peas to the surface. Sowing should be at the rate of 1bush. to 1½bush. per acre, with 1cwt. of super. At harvest sheep or pigs would clean up every grain, and provided that summer rains were not too much above the average, there would be no loss. Also, sheep fattened on peas would bring a good price in the market at a time when prime stock was not plentiful. Harvesting was, of course, more satisfactory, but required more labor. The peas should be carted as soon as possible, and rolled out or threshed at any time, or fed to stock straight from the stack. Stock ate the haulms readily, but too much was not good for horses, as it had a tendency to cause bowel stoppage. If the land was cultivated thoroughly after the peas were cleaned up in that locality it would carry as good a crop as bare fallow. Another valuable crop was silver beet or Swiss chard. The best of all fodder crops under favorable conditions was lucerne, but much water and manure was required for that plant, and at present under local conditions it could only be grown on a very small scale.

MURRAY BRIDGE.

August 28th.—Present: 19 members and visitors.

Dairying.—Mr. H. B. Kuchel, on behalf of Messrs. Kuchel Bros., read the following paper on "Dairying." In the first place, he said, when building yards a well-drained position should be chosen, preferably facing the east, as that would shelter the stalls from south and north-west gales, and the stalls arranged in order to give the cows an easy means of exit after they had been liberated from the bails. In order that the cows would readily give down their milk they should not be kept standing about the yard, nor distressed in any way. If possible it was well to have the cows milked at regular intervals, and allow them an occasional change of pasture, taking care that they always had access to a good supply of fresh drinking water. On account of the labor shortage they had found it necessary to install milking machines, and they had proved great labor-saving machines. All milking utensils should be kept scrupulously clean, and the cream sent away to the factory at least every second day, particularly during the summer months. He spoke in favor of the Shorthorn breed of cattle as the one best suited for dairy purposes in that district, and said that a system of testing should occasionally be carried out. He advised members to rear their own heifers, and allow them to come into milk when about 27 months old. In all cases the cow should be allowed to suckle her calf for about 10 days. The mother should be in a good, lean condition prior to calving. She could easily be raised to a better condition afterwards. By allowing the animals to carry hard stall condition trouble would be almost certain to follow in the form of either milk fever or bad cleansing at calving. They preferred to give cows that were about to calve eight to 10 weeks spell, and during that time to turn them out to pasture away from the milking herd. They had at all times practised and would advocate having the bull running loose with the cattle, when after serving for three years he could be disposed of. Linseed meal added to skim milk, with a dash of lime water had given them complete satisfaction as a food for rearing calves. A stack of lucerne or other soft hay would supply all the shelter needed, and would also give the calves something to nibble at. A little green picking should also be provided for them at this stage, but the stack was the most necessary. If that precaution was neglected the calves would invariably suck each other, and the results would be disastrous. The ration must be increased as the calf grew, and at the end of three weeks 3½galls. per day should be given in two rations. A trough of fresh water in the yard was a splendid addition in the summer months, for in the long, hot days the calves would frequently take a sip. With a little extra trouble the older ones, when nearly fit to be turned out, could be kept off the milk trough while the others were being fed, and as a result they had no option but to repair to the water, and when turned out would drink water readily and look for nothing better. Bull calves should be castrated when from four to six weeks old, and all calves would be fit to turn out at three months.

MURRAY BRIDGE.

September 25th.

Afforestation.—The Conservator of Forests (Mr. Walter Gill) delivered an address on forestry, and in the course of his remarks said—"In considering the question as to how to improve our timber supply, it will first be necessary to investigate the conditions antecedent to the establishment of the Forest Department, and to ascertain what circumstances have attended its operatons during subsequent years. When we inquire into this matter we find that South Australia has never been so lavishly favored by nature with magnificent forests as her sister States have. She has hundreds of square miles of dwarf scrubby growth, like the well-known 'mallee,' and thousands of acres of country where trees are scattered here and there, with large imposing heads and short trunks, which, though giving a pleasing park-like appearance from an ornamental aspect, are from a commercial standpoint very poor producers of merchantable timber. Of forests of a normal type, however, with a good stand of timber, she has but few, and they are limited in area. Her valuable timber trees are also confined to but few species, but those she has are not surpassed in excellence by those of any other State. The most important forest area is situated in the Mount Lofty Ranges, near Adelaide, skirting the eastern shore of St. Vincent Gulf, right from Cape Jervis, near Kangaroo Island, for a considerable distance and then terminating north in the Barossa Ranges. The Flinders Ranges constitute another valuable timber centre; they run east of Spencer's Gulf, starting about 120 miles north of Adelaide, and break off near Quorn, where they are outside of Goyder's well-known line of rainfall; the forest trees, though fully developed at first, become sparser there and the timber of less value. The last of the important areas commences about 180 miles south-east of Adelaide, in the neighborhood of Bordertown, where the open scattered type of forest growth prevails at first and runs right down to Mount Gambier, in which district the stringybark forests carry a denser stand of timber of a more regular type, under the better conditions of climate and rainfall existing there. Small areas of forest in addition to these occur here and there, but these are the main centres of importance. All these areas, unfortunately, are situated too far from the coasts to be within easy distance of water carriage, and here we find one great disadvantage under which forest operations labor in South Australia, as compared with conditions existing in Tasmania for instance. There, on such rivers as the Huon, the Derwent, the Gordon, and others, the mountains are clothed with fine forest trees reaching right down to within a short distance of the water's edge, with the immense advantage of water deep enough to float even ocean-going steamers in many cases. 'What's the length of the piles you want to repair your jetty?' I asked the manager of the Geeveston sawmills, when visiting Tasmania a few years ago. 'One hundred feet,' he replied. Then again, our forests are thinly timbered as a rule, compared with Tasmania, and the trees here are at their best size only half the height of those in that favored locality. I measured one fallen giant in the Huon district in March, 1911, and found it to be 150ft. to the first limb, and even there it was 3ft. in diameter, and at a very conservative estimate it contained 2,000 cub. ft. of timber, as much as would be found in good spots in some of our forests on one acre. In February, 1916, I was again in the Geeveston Forest, and photographed a timber train hauling five big logs each 40ft. long and 5ft. in diameter under bark, 560 cub. ft. each, a frequent yield, the foreman told me, from one tree. While this year in the same month I secured a good photograph of a tree just felled 110ft. long and 4ft. in diameter in the middle, up in the Port Esperance Forest, 1,000 cub. ft. (quarter girth). 'How long has this mill been working here?' I asked of the manager; 'it seems to look pretty old.' 'Over 60 years!' was the reply; so it is obvious that not only are the trees big, but the stand of timber was dense as well. Numerous other instances might be cited if time permitted, but enough has been said to show the great forest wealth of Tasmania. Now, in considering the conditions prevailing in the South Australian State forests, what do we find? Instead of close proximity to seaboard, our State forests are all too far away to admit of profitable transport in the case of any produce from the native hardwoods, and again, the trees themselves are usually so scattered, and the stand of timber so thin, that whereas timber can be landed in Adelaide from Tasmania at 8s. to 12s. per 100 super., it cannot be landed in Adelaide from any Government forest at less than 25s. per 100 super. Thus the output of produce is mainly limited to the local demand, which is too often very limited. When the grave disadvantage thus indicated is actually realised, the question naturally arises, how was it that better positions were not selected for State forests?—and the answer is that it was so late in the day ere any importance was attached to forestry that all the best forest lands had been either bought right out or leased; so only the poorest and those the farthest off were left to choose from, and even then the imperative necessity for reserving forests near the best probable market seems to have escaped notice. It should not require much reflection to see that the existence of a good market must constitute the key to the success of any undertaking from a financial standpoint, and that its absence or severe limitation must constitute a great barrier to success. It is further clearly evident that the market is dependent upon the population, for when that is small and widely scattered, the demand must be lessened accordingly; in this connection the frequent tendency residents show to migrate from one district to another has also an important and frequently very unsatisfactory influence. The prospects for the timber from our pine plantations have received a very encouraging impetus owing to the considerable rise in prices of all softwood timber. During the last 14 years, by steady and persevering effort, the department has most successfully demonstrated the value of the timber of the Remarkable pine (*Pinus insignis*), which at the outset was regarded by those unacquainted with its characteristics as a useless timber. Now it is admitted to be

without any superior for many purposes, especially for fruit cases. Since the department began to demonstrate its value by cutting apple cases for the orchardists at Wirrabara in 1903, the number of cases of all kinds sold from the three mills at Wirrabara, Bundaleer, and the South-East has been 596,529, the gross value received has been £20,150 13s. 9d., and deducting working costs, £15,895, has left £4,255 for the revenue. The volume of timber obtained from each acre will, of course, always vary according to conditions of soil and climate and cultural treatment. The most successful result has been secured at the Mount McIntyre plantation near Kalangadoo where, during the last two years, 100,000 cases have been cut from an area of six acres of trees 33 years old, with a return of £2,001 to revenue, after paying milling costs. This gives over 16,000 cases to the acre, a return which does not appear to offer much margin for further improvement. The gross volume per acre was over 100,000 super. feet, which has, it is reported, been secured from this pine in New Zealand, but never, I believe, in any other country. The trees were planted 6ft. by 9ft.; theoretically better timber is to be obtained by planting much closer, but a counsel of perfection does not always answer when the funds available have to be considered, and the probable price obtainable must always be the principal factor in expenditure. It is safe to say that when the best markets are available for all our timbers, then many a course may be open for improving them, which hitherto has been compulsorily closed—but it is open to question whether it may not ultimately be found better for each State to confine its operations to the production of only those timbers which its special conditions eminently fit it to develop. In concluding these remarks it is instructive to note that when visiting South Australia a year or two ago, Mr. D. E. Hutchins, a retired Conservator of Forests, who is a highly trained forest expert with extensive and life-long experience in India and South and East Africa, made a thorough inspection of our forests and plantations, and in a valuable work on Australian Forestry, which has lately been published by the West Australian Government, he states, *inter alia*—'South Australia has not much to improve in its forestry. It has long been a model to the other States. It seems to be lacking in two particulars to render the forest work complete—(1) more funds, (2) plantation sites that are more accessible.' As regards the first of these criticisms, the larger funds allotted for forest work during the last few years have greatly improved the forest prospects, and in connection with the second, it is only recently that legislation has been enacted to enable the department to buy land for forest purposes, but ever since then every opportunity has been taken of following the course thus indicated by recommending the acquisition of such lands as are more closely in touch with the main centres of demand, which will undoubtedly secure better facilities in future for disposing of forest produce. The marked rise in all timber rates in consequence of the war cannot fail to have a beneficial effect not only by increasing returns from existing plantations, but also by enabling methods to be adopted in forest management which before were out of the question. When we reflect on the utter destruction of so many towns and cities caused by this war, it is clear that the demand for timber for rebuilding will be enormous; but this demand cannot be met by many of the European forests, as they have been destroyed also. It is therefore evident that outside sources of timber supply will be heavily strained to meet this emergency. Forests, therefore, from which large quantities of timber have been shipped here hitherto, will cease sending their timber here while closer markets are available. This means continued high prices for some considerable time, which will give ample justification for increased expenditure by the State which, with the experience gained in previous years, will give the required impetus for improving our timber supply.''
At the close, in answer to a question, Mr. Gill said that generally speaking it was not advisable to grow timber on poor land as a profitable investment. It was an axiom that good timber would not be got from poor land. Where the land was rocky, the moisture soon dried out, and the trees would not make a good root system. For good timber, the trees must be planted close together to get straight, even trunks, without many branches, which would cause knots. In regard to the trees most suitable for the Murray Bridge district, sugar gum would do well when not in too much limestone; the Moreton Bay fig, Kingston oak, pepper, and the carob bean would all be suitable. The tamarisk would stand a much greater amount of salt than most trees, and, in fact, he had known them to grow on the edge of salt water. The Aleppo pine and cotton palm would do on salt land,

especially the cotton palm, which did well in Colorado in salty land, where only 2in. to 6in. rain fell. It was important to cut the timber in autumn, or when sap was at low ebb; with that precaution the timber would season better and have a much longer life. Young sappy wood should not be used where older and matured timber could be obtained.

NETHERTON.

September 28th.—Present: 11 members and three visitors.

Scrub Farming.—In a paper dealing with farming in mallee country, Mr. H. Godsen said that under present conditions he would not advise anyone to commence scrub farming unless they had had previous experience. He believed that success could be attained, if when the shoots were cleared, mixed farming was undertaken. Taking as an example a farm of 1,000 acres, the block should be divided into four paddocks at the outset, as fencing material was so expensive, but as the stock on the farm increased, and profits were received from the sale of same, the holding could be divided into smaller paddocks. Oats should be sown after every wheat crop, which could be cut for hay. The land should be fallowed early, about 4in. deep, and the harrows run over the soil when ploughing was finished.

RAMCO.

October 1st.—Present: 14 members and one visitor.

The Nursery.—Under this heading a paper was contributed by Mr. L. Darling, who said that it was his intention to deal with the propagation and working of deciduous fruit trees most adaptable to the Murray Valley and its climatic conditions. "Many or most of the deciduous fruit trees," he said, "are propagated from seeds, although numbers can be grown from roots and cuttings, but as these root cuttings are difficult to handle, and need great care, nurserymen generally propagate from seeds when possible. These seeds can be obtained from jam factories or canneries during the months of January, February, and March, and are then buried in sand until the rush of the lifting season is over, when they are planted. Under the heading of 'Cuttage' come such trees as the plum and quince. The cuttings are cut during the fall and tied in bundles of, say, 200, each cutting having its butt corresponding. These cuttings are always cut to an eye at the top and bottom, and are generally about 10in. in length. Sometimes an entire section is removed with the cutting from the parent branch. Of course, comparatively few of these cuttings can be made from a branch, therefore the nurseryman must resort to the ones cut to a bud. In passing I might say there are some plants which demand a heel cut, although not to my knowledge in fruit trees. The requirements of different species can only be learned by experience, but it may be said the hardest wooded plants require a heel, while soft-wooded plant cuttings emit roots readily between the buds. After these bundles are tied, they are kept dormant by storing in sand, where the wounds begin to heal by the formation of loose cellular matter, which gives rise to a mass of tissue known as a callus. This tissue will eventually cover the whole wound if complete healing results. The first apparent change is the formation of a callus at the base. Although it is supposed by many that roots are only formed from the callus itself, they forget that some plants have roots arising from the bark at a great distance from a callus. Mr. Bailey writes on this point—'Roots do not arise from a callus itself, but from internal tissue.' The most singular fact about cuttings is that the lower end produces roots, and the upper end leaves, even if the cutting is inverted. If you divide a cutting it will still exhibit the same difference. Grafting is used a great deal in modern nurseries for propagating, especially for apples, prunes and plums. This is a very long operation, and occupies a great deal of time, and needs well-trained and competent men to perform it. In dealing with grafting, I shall divide it into three classes—(1) Root grafting, in which a root is entirely the stock; (2) crown grafting, where the graft is inserted into the crown of the stock; (3) trunk or stem grafting, in which the scion is set on the trunk or stem of the tree. This system is often employed when working over two or more year old trees, which for some reason or other have not been able to quit during the lifting season. In grafting great care should be taken in inserting the scion into the stock, as the union depends solely on the cambium layers of the two affixing closely together. No matter what care is taken in choosing sound healthy stocks and scions, if the cambium layers on one side of stock and scion do not come in contact with one another, all efforts will be fruitless, for it is impossible for the two to unite. If a well-grafted tree is cut at the union—I say cut, for it is almost impossible to break at the graft after say two years—it will be found the wood of the scion has never united with the stock, it only being the cambium tissue which has united. The wood will have a dead appearance. The scions are generally cut during the dormant season, and stored away in sand until the first approach of spring, which is generally recognised as the grafting season. Root grafting in South Australian nurseries is generally confined to apples, and covers a lengthy period. During the lifting season all superfluous or lengthy apple roots are cut or suppressed from the trees prior to packing. These roots are also stored in sand until the spring, when they are washed and cut into pieces from 3in. to 5in. long. I might say here these roots are mostly Northern Spy, being known as blight-proof (*i.e.* woolly aphis). The scions are also Northern Spy, which are cut as I stated above during the fall, and from the trees which were worked the previous year. These scions are cut into lengths of about 9in., and are generally one year old wood. In most cases the stock and scions are approximately of the same dimensions, namely, as thick as a lead pencil. This being the case, and other things being equal, the whip or tongue graft is generally practised. When whip grafting both the scion and the stock are cut across diagonally with a slight hollow in the centre from 1in. to 2in. A vertical cut is then made in both, and the two are joined together by pushing the tongue of the scion into the tongue of the stock, care being taken to see the cambium layers come in contact with one another. The parts are held together by a bandage of raffia or candle cotton, which is passed round them several times. Sometimes it is found impossible to perform the whip graft, as perhaps the root or wood may be too small to be cut diagonally or vertically. The graft then adopted is generally the root side graft or side graft. The stock or scion, whichever is the larger, is cut obliquely for about an inch, making certain not to cut too deep to weaken the part. The other is then cut wedge-shape, and is pressed into the incision until its cut surfaces are concealed in the stock or scion, whichever the case may be, and tied the same as the whip graft. These small grafts are then taken and planted in rows, where they are reworked by budding the following summer. This long operation has to be performed to make the stock, as I stated before, blight proof, otherwise it could be propagated by seeds, which are largely exported from France, and which are technically known as the crab stocks, the word crab being used in the sense of a wild or inferior apple. These stocks are very hardy and vigorous, but are not blight proof, therefore are useless to the Australian nurseryman. The operation of crown grafting is generally performed on olives, and in cases where the nurseryman wishes to obtain trees the following season. In crown grafting the cleft graft is almost without exception adopted. I am taking now the crown cleft graft. The operation is performed in a shed, although it is not essential to dig the stocks out of the ground, but it makes the work much easier, and not so tedious. The stock is cut off squarely at the collar, and split to a depth of about 1in., and into the split a scion with a wedge-shape base is inserted. The end of the stub will often accommodate two scions, one upon either side; this often hastens the healing of the stub. The scions and stock here also must have their cambium layers in contact with one another on one side. These are then tied in precisely the same manner as the whip graft, unless the graft is to be above the ground, when wax must completely cover the graft, but nurserymen avoid this by planting deep enough to cover the graft. Trunk or stem grafting is also only adopted when the nurseryman wishes to obtain trees the following fall, and is generally performed with the whip graft. There are many other grafts which nurserymen use, such as veneer graft, bark graft, saddle graft, and splice grafting, but the few I have explained are the methods in general use. A good recipe for grafting wax is—Resin 4 parts in weight, beeswax 2 parts, tallow 1 part. Break the resin and beeswax, and melt all material together. When thoroughly melted pour into a pail of cold water. It soon becomes hard enough to handle, after which it should be pulled until it becomes tough. Budding is largely and mostly employed to multiply varieties of fruit trees, and in South Australia is the only method adopted in working apricots and peaches. This operation can be performed during the growing season, after the buds have matured sufficiently; or in the early spring, as soon as the bark loosens. If performed at this period buds must be taken in the winter and stored in a cool place, or if the scion has sufficiently matured to permit sound buds being taken out of the young growth healthy spring-budded trees may result. Spring budding is seldom, if ever, resorted to on a big scale by the nurseryman, as it is too uncertain. Budding is in every case best performed when the bark slips and peels easily. Of course it can be done when the bark is tight by scratching and tearing, but it is very tedious, and the result uncertain. It is rarely a nurseryman continues budding in wet weather, as the rain gets between the bud and stock, which prevents a healthy union, if any at all. There are many different styles of budding, but I am only going to deal with the one adopted by the nurserymen of this State. This is known as shield budding, deriving its name from the shield-like shape portion of the bark which is removed with the bud. The length of the shields differ with nearly every operator, some cutting short shields, others leaving quite a tail on the shield. I generally cut the buds for ordinary work about an inch in length. Of course the size of the bud differs with the size of the stock; a thick stock will take a larger bud than a small thin one. Stocks should be ¼in. in diameter to be budded expeditiously, and should have all leaves and small shoots removed, so that the operator will only have to bud and not trim the stocks as he goes. These leaves and shoots should be removed a distance of about 6in. from the ground, and great care should be taken when removing, as the bark is generally very tender, and is inclined to tear, which tearing renders it oftentimes useless for budding at that particular period. Two incisions are made in the stock to the depth of the bark, one vertical and one transverse. The vertical cut is usually made first (although I do the opposite) with the point of the budding knife, which I may say here must be razor-edged to do excellent work. This is about an inch and a half in length. The second cut is made by a rolling motion across the top of the vertical cut. The bud is then taken and pushed downward, when it will be found if the bark splits freely it is in good condition for budding. The bud must be tied so that the whole wound is closed, and tied securely with string if better material be not available; but nurserymen generally use raffia. Care should be taken not to bind the string over the bud itself. In two or three weeks after the bud is set it will have united to the stock; the bandage must then be removed. If the ties are left on too long they will constrict the stem, and often kill the bud, and they also have a tendency to cause the bud to grow, when the bud should remain dormant until the following spring. It can be seen if the bud still has life by making a little incision just below the eye; if this is a healthy color it can be relied on the bud is still alive. In cutting the buds, they should be taken only from well-hardened shoots of the season's growth, and of the desired variety. This growth varies in length, but is cut into lengths most convenient to handle. The leaves are removed, leaving the petiole of each leaf and the buds are then cut with a sharp knife, most budders cutting from below upwards. The buds are cut to a depth of approximately 1-16in., varying with size, therefore a piece of wood is removed with the bud, and before pushing the bud into the stock, this is generally removed, although many budders leave this in, but my experience has taught me by removing this a better take is assured. No doubt there has been controversial discussion of the relative merits of grafted and budded trees, but both are equally satisfactory methods of propagation. To my knowledge no experiments have been tried by Australian nurserymen, although I believe the majority consider a budded tree makes the most shapely and strongest tree, and I would always prefer the latter to the former. 'Does grafting or budding shorten the life of a tree?' Many will say it is unnatural to graft and bud, but they little think how unnatural it is to grow cuttings, and how unnatural it is to transplant, prune, &c. In all cases the most unnatural processes which the tree undergoes makes it better equipped than the one which is left entirely to Nature. In, say, a row of seedling apricots, one will find large, small, and indifferent, but a row of well-worked trees will, generally speaking, be of even height and growth. The same applies to a seedling in an orchard, where it has the same attention and the same environment as the trees of known hardiness, yet it remains small and stunted. Of course there are cases in which prolific seedlings are found, and these are often left by the owner, who may be fortunate enough to secure a new variety. It is almost impossible if one considers the facts broadly, to think grafting is devitalising. An experiment compassed by the lifetime of one man in Michigan proves that trees own rooted do not live longer and are not healthier than grafted ones. Some 40 odd years ago seeds were taken from Vermont and planted in Michigan. The seeds produced lusty trees, but the majority only bore inferior fruit. These were grafted, only some of the original branches were allowed to remain permanently, while some were entirely changed over. A few trees which chanced to bear tolerable fruit, were allowed to remain, not being grafted. Many of the trees in this orchard died from undeterminable causes, and probably even more than half of the deaths were seedlings, but the most interesting fact is that the trees which contained some original branches showed similar results. Any treatment which makes the tree grow vigorously may contribute to their stockiness, which is the chief aim of all nurserymen. The trees should be given 2½ft. in the row, and about 8in. to 10in. between each tree. All leaves should be allowed to grow on the body or stem of the plant, but, however, it will be found young forking shoots will make their appearance on the body also. These should be removed carefully, as they always grow in the axil of a leaf, but they can be removed without injuring the leaf, which is important to leave so that it can afford shelter to the stem during the hot weather. Many nurserymen head in their trees during the early summer, which forces the shoots from the bottom to the top of the stem, after which the above operation is performed, only leaving sufficient shoots at the top to form the head. I think this operation should have more consideration from the nurseryman, as once these young shoots are taken out, it is almost impossible to force growth from the place of removal, and in many cases, and especially in the valley of the Murray, where high winds prevail, we need low-headed trees. I have frequently been at a loss when pruning one-year-old trees from the nursery to get suitable buds without having to resort to the top the nurseryman formed, which oftentimes is as high as 2ft. 6in. from the ground. If nurserymen allowed their trees to grow maiden trees, that is, straight up, the bottom buds would not shoot The orchardist could then select healthy buds near the base of the graft or bud, or higher if he so wished, and thereby shape his own tree. For peaches, apricots, and fruits of a like nature 9in. from the bud, which is generally 2in. above the ground, making 11in. in all, is the most suitable, in my opinion, for the valley of the Murray. Dwarfing is mostly done in the nursery by working on slow-growing stock. Although trees are worked on slow-growing stock, if the trees are planted so deep by the orchardist that the union is a few inches below the ground, roots may start from the scion, and the tree may be half-dwarfed or full standard; therefore it lies mostly with the grower to keep it permanently dwarfed, not with the nurseryman. The pear upon the quince is the best illustration we have of dwarfed fruit trees, also the apple upon the Paradise stock, and the peach upon the plum are good also. Although dwarfing may have its advantages in some districts, I would never plant a tree for commercial purposes on the Murray unless it was on its own stock. In passing, I might say the apricot is worked on the peach stock in the United States with excellent results. The best land for general nursery work is one which is rich in humus, and which does not set hard, yet contains a fair percentage of clay; although the irrigable land on the Murray should be admirable for nursery purposes. The land should be ploughed and subsoiled to a depth of 15in., for nursery trees constitute a crop which occupies the land for perhaps a number of years. The sale value depends on the growth, therefore it is imperative to secure rapid growth within as short a period as possible. Fertilizers should be added to the soil when planting, bone super. and bonedust, or any fertilizer that will assist in producing rapid growth. It is generally considered that nursery land can rarely raise two good crops of the same trees in succession; yet, despite this fact, after the removal of the trees good crops of wheat can be grown, and sometimes a different type of trees is grown on the land. For instance, after removing apples, I have seen peach seedlings 4ft. to 5ft. in height. The following shows the method adopted by nurserymen in propagating the various varieties, dealing principally with those trees grown on the Murray:—Peach trees are universally budded. The pits are planted in rows, either thickly or from 6in. to 10in. apart; the latter when budding is to take place the following summer, and the former when the seedlings are to be left and transplanted the following winter. If, in the event of the stock making insufficient growth during the season, that is, when spaced, this growth can be cut down to the ground the next winter, and one shoot be permitted to grow, which can be budded in summer, being in its second year. Peaches are sometimes worked on plum stocks where they are to be planted in damp soils, but this dwarfs the peach, and it does not thrive as well as when worked on peach stock. The nectarine is propagated in exactly the same way as the peach. Apricot pits grow and are sown precisely the same way as the peach, except they are generally planted in rows 2ft. 6in. apart, and very thickly sown. They are then replanted the next winter about 10in. apart in the row, and budded and treated the same as the peach. Apricots, as I stated before, are extensively budded on peach stock in the United States, especially in the dry districts. They are also worked there on the Marranna plum stock, but the Myrobolan plum stock is not popular in that country, especially in severe climates. The almond is also used as a stock, but the union is generally imperfect, and not to be recommended. In Australia apricots are usually worked on their own stock, which undoubtedly is the best. Pears are propagated by seedings, which are sown in rows 2ft. 6in. apart, or thereabouts. They are sown thickly, and left until the following winter has well advanced, when they are transplanted in rows similar to the peach, the budding process being the same. Some pears may be dwarfed by working them on the quince stock, and many nurserymen advocate planting William Bon Chretien and Glou Morceau on quince stock in the Murray district, as the quince is a much shallower-rooted tree than the pear, therefore making itself specially adaptable to irrigation; but I would rather have trees on their own stock. Pears may also be grown from cuttings or root grafted, but nurserymen very rarely resort to this, as the operation occupies too much time, and the seedlings are more sure, especially than cuttings. It is rarely the nurserymen of South Australia propagate prunes and plums by pits, although in the United States plum pits are sown. In our State the majority of the plums are grown by cuttings of either cherry plum, Myrobolan, or Marranna, the first two being more in use. These cuttings are planted in the early spring or during the winter months, and are ready to bud in January. Although the Myrobolan is really a dwarf stock, it being a slow grower it makes a good stock. Plums can also be worked on the peach stock, and I have seen some fine specimens of young Japanese plums on the peach, the union being perfect. Although quince trees are not grown to any great extent on the Murray, the majority of orchardists have some planted, although uncared for, in some corner. They can be grown from seeds the same as pears; but seeds are difficult to obtain, therefore they are little if ever used. Another method is by cuttings from fruiting trees; but these are likely to sucker. Most nurserymen bud or graft on the barren quince—that is, the trees that do not bear. These trees do not sucker to any great extent, and yet are prolific and hardy. The stocks are obtained by planting cuttings in the early spring or late winter, and are ready to bud the following season. Loquats can be grown from seeds, which will bear fruit, but should be worked to ensure good results. The majority of the loquats, I think, in our State are worked by budding on the barren quince, which, I think, makes a very good, strong stock, and to my knowledge I have never seen nor heard of a bad union, unless through carelessness on the part of the operators. In most cases in our State almonds are worked on seedling almond stocks, although the peach can be used. Apricot stocks are not to be recommended. The seeds and seedlings are treated in precisely the same manner as peaches. Figs can be grown from the large stout seed from any of the fruit used commercially. The seeds should be washed out, and those that sink can be sown, the floating ones being useless. They take about four weeks to appear, but when in bearing they most probably will prove untrue to name. However, new varieties can be obtained in this way. In most cases varieties of figs are multiplied by cuttings, which are handled in the same manner as grape cuttings, which every orchardist knows how to root. Another manner is by suckers, and yet another means of propagating by budding or grafting. Mulberries are generally propagated by cuttings, and new sorts can be obtained by seedlings. There are many methods of propagating the apple, namely, by seedlings, stools, root grafting, and top grafting. Root grafting is practically the only method adopted on a large scale by modern nurserymen, as this is the only manner to secure blight-proof stock in quantities. Seeds from Northern Spy apples will not reproduce the variety. I write Northern Spy, for that is the stock mostly used. When the grafts are planted the scion is planted deep enough for it to take root also. After these small grafts have grown a few months, they can be reworked to the desired variety by budding, the bud being placed a little higher than in other trees, so that the woolly aphis has not the opportunity to obtain a foothold. In closing, I would like to give a little advice in selecting trees, and on the purchasing of same. There are many tree pedlars, as Californian growers call them. I am not aspersing the accredited representative, who introduces his firm and appoints a local agent, who assists him in disposing of his trees; nor do I refer to the nurseryman who has so much confidence in his trees that a traveller is unnecessary; but to the unscrupulous person who advertises certain trees when the nursery is bare of such varieties, and finds them at the expense of the orchardists in later years. Cheap trees are seldom, if ever, a bargain; the grower should insist on having first-class trees, and should be willing to pay for them. The question of where the trees are grown does not seem to be so important as the condition in which they arrive. Provided the trees are grown well, it little matters whether they are grafted or budded, although budded trees generally make better growth in the orchard the first year, and have generally a superior rooting system. The age of the tree matters little, for a two or more year old tree from the nursery does not come into bearing any sooner than a one-year-old. In choosing the tree, most satisfactory results will be gained from a one-year-old budded tree (maiden if possible), about ⅝in. to ¾in. in diameter. Trees are often delivered by the nurseryman before the grower is ready to plant. The bundles should be unpacked, for if stored in large bundles they may heat, and the buds start to shoot. A trench should be dug and the soil well broken up, so that when the roots are placed in the trench the fine earth will cover the roots completely, and not admit air. The layers of trees should not be thick, and should be placed at right angles to the trench. Unless the soil is very moist, water should be sprinkled over, and another layer of fine earth placed on top, to prevent baking and drying out. Trees may be kept dormant longer by burying root and top. Trees that are received in a shrivelled condition should be buried root and top, in a well-moistened bed, and kept there until they regain their original plumpness. If planted the chances are they will not survive.''

ROSY PINE.

September 26th.—Present: 17 members.

Hay-making.—In the course of his remarks in a paper dealing with this subject, Mr. R. E. Schiller said one of the first duties of the farmer was to provide feed for the working stock of the farm. Oats should form a large part of the crop cut for hay, and provided it was cut at the right time the horses would do very well on it. In addition to that it was an excellent crop to sow where the land was affected with takeall. A piece of well-worked fallow should be selected on which to grow the hay crop, and all stumps and shoots cleared off directly after seeding. The binder should be thoroughly overhauled, and all damaged parts replaced. Oaten hay should be cut just as the straw was turning purple, and wheat cut when the grain was in a milky stage. He was in favor of stooking the hay directly after the machine, as that helped it to retain its color. The stooks should be formed by placing four sheaves deep, two in the centre, and one on either side. Stooks built in that manner would stand a fair amount of rain without much damage. All stacks should be built on dunnage, and the outside sheaves placed, butts outwards, care being taken to see that the centre of the stack was kept about 2ft. higher than the edges to prevent water from getting to the inside of the stack. In discussing the paper Mr. Lucier thought a better plan was to erect the stack on a stage, that would prevent mice from damaging the hay. Mr. C. A. Schiller agreed with the previous speaker, and said that when iron was a reasonable price it would pay to erect a shed.

WOLOWA.

September 26th.—Present: six members and seven visitors.

Homestead Meeting.—The meeting of the Branch was held at Mr. Stone's residence. During the afternoon members inspected various farms in the vicinity of the residence, and on these some promising crops were seen. A paper was read by the Hon. Secretary (Mr. A. Stirling) entitled ''Shade Trees for Stock,'' in which he said it was a great mistake for farmers to clear the whole of the timber off their holdings. It was almost a common sight to see stock in the hot summer months clustered around a small clump of trees, only sufficient to shelter two or three of them. In the winter it was practically the same, the stock could be noticed shivering in the open for the want of necessary shelter. Several clumps of timber left in the paddock would form a good breakwind, and enable the stock to obtain shelter from the hot weather and severe rainstorms. That would also be a corresponding advantage to the owner, as the stock would keep in much better condition. Apart from the benefit that the stock would derive, the appearance of the farm would be much more attractive.

BOOKPURNONG EAST, October 6th.—Papers were contributed by Mr. E. Seilor on "Strippers," and by Mr. W. Hammond on "Harvesters." A good discussion followed, the census of opinion being in favor of the stripper and winnower.

BORRIKA, September 29th.—The meeting discussed at length the report of the delegates on the proceedings at the Congress in Adelaide.

CLANFIELD, September 29th.—The report of the delegates to the Annual Congress was received and discussed, and the remaining portion of the meeting took the form of a question box evening.

GERANIUM, October 16th.—The Veterinary Lecturer (Mr. F. E. Place) visited the Branch and gave a practical demonstration of castration, and in the evening delivered an address on "Poisonous Weeds," and "Red Water in Cows."

MONARTO SOUTH, September 29th.—Mr. E. Leishman read an extract from the *Journal* on "Poultry," and Mr. G. Patterson reported on the proceedings of the recent Congress.

PARRAKIE, September 29th.—The reports of the delegates to the Pinnaroo and Adelaide Conferences were received and discussed.

RAMCO, August 27th.—The Branch discussed at length the matter of the formation of a Citrus Growers' Association, which was brought forward at the recent Conference at Waikerie.

WAIKERIE, October 28th.—Mr. L. B. Pope reported on his visit to the Agricultural Congress. Mr. A. G. Ifould tabled a cutting from a patch of sultanas. Members were of the opinion that the vine was suffering from black spot.

WILKAWATT, September 29th.—The delegates reported on the proceedings of the recent Congress, and read extracts from various papers.

SOUTH AND HILLS DISTRICT.

BLACKHEATH.

September 29th.—Present: 12 members and three visitors.

CARE AND MANAGEMENT OF YOUNG HORSES.—Mr. H. Paech read a paper on this subject, in which he said every farmer should endeavor to breed his own horses. Only the best sire should be used, if possible a stud book horse, and one that had a Government certificate for soundness, and if mated to mares that were stanch and active, the foundation for the formation of good foals would have been laid down. The mare rearing a foal should have a good paddock to graze in, and particular care should be taken to see that the fences were in good order, because if they were neglected the foal was liable to seriously injure itself. He was in favor of handling the foals when they were quite young, and weaning them when about six months old. A good plan when weaning, was to tie the foal up with a halter for half a day, in order to get it accustomed to being tied up. Careful attention should be paid and the foal watched to see that it was kept in good condition when being weaned. At 2½ to 3 years of age the foal should be broken in, preferably during the ploughing season. An open bridle should be used, and the horse carefully mouthed. Leather traces should be employed when the first lesson in hauling was being given, as there was no danger of the leather chafing the legs and sides. Above all one should see that the collar chosen for the young horse was a well-fitting one, and if the shoulders were carefully washed with Condy's crystals dissolved in warm water each day after work, much would be done to avoid the trouble of working a horse with sore shoulders.

BLACKWOOD (Average annual rainfall, 27in. to 29in.).

September 17th.—Present: 14 members and two visitors.

CULTIVATION.—In a paper dealing with this topic Mr. G. W. Summers said the objects of cultivation were to destroy weeds, to allow the entrance of air into the soil, and to prevent the evaporation of moisture. No hard and fast rule could be laid down as to what was the correct time at which to commence ploughing, as climatic conditions and the varying nature of the soil in different districts were factors that had to be carefully considered. As a general principle, he thought the ploughing should be left as late as possible, and in support of that opinion he pointed out some of the disadvantages of early ploughing. Firstly there was little or no green stuff to turn in to act as manure, secondly by early ploughing one was likely to lose much of the soil by washing, and thirdly during a very wet winter the ground would be set down harder than it was before being cultivated. If, when being worked, the land broke up into large clods, it was advisable to run a roller over it and then loosen the surface with the harrows, and if necessary repeat the operation. It was a good plan to see that the direction of the last cultivation was across the hillside, not up and down. If the latter plan was followed the first rain that fell would turn the small furrows into gutters. After any rain that fell during summer the land should be worked to conserve the moisture. By using a spring-tooth cultivator he had been able to work right up to the butts of the trees.

CHERRY GARDENS (Average annual rainfall, 35.03in.).

Present: 14 members and one visitor.

DAIRYING.—In a paper dealing with the principles of dairying Mr. H. Jacobs said that to make a success of that industry one should have suitable country and be able to give the cows the very best attention. He thought the cows should be broken into the bail, as they would stand quite contentedly, and there was no fear of another animal horning them. Only by kind and gentle treatment would the animals give best results. Where there was a number of cows to attend to it was a good plan to have the same person milk the same cows. The cows should be milked as quickly as possible, and stripped quite dry. Cleanliness was essential, and care should be taken to see that all utensils, cows' teats, and the milker's hands were kept clean. Separating should be done directly after milking, and to ensure clean skimming, the machine should be set firmly on a level block, and worked at the correct number of revolutions per minute. He did not think it was wise to put cream into the can until it had cooled down. During the warm weather the cream should be churned twice a week, as it ripened more quickly during summer. Once a week would be sufficient in cool weather.

CLARENDON (Average annual rainfall, 33.67in.).

August 28th.—Present: 20 members and three visitors.

Mr. J. Piggott addressed the meeting on the necessity for improved methods in road-making, in order to meet the requirements of the automobile. He favored the purchase by the local council of a crushing plant that could be easily moved to the various quarries, to get over the labor difficulty, and also to get an increase of metal at the present allowance. By that means the road upkeep would be materially reduced.—At a meeting held on September 24th, Mr. Pike, managing director of the Payneham Jam Factory, gave an interesting and instructive address on "Co-operation," and also outlined the benefits the producers had received from the factory, worked on that principle. He pointed out that not only the producer was benefited, but also the employee and the dealer who distributed the finished product. Mr. Naughton, manager Gardeners' Supply Stores, also addressed the meeting, and pointed out the benefits derived by members in the distribution of manures, seed, &c.

CYGNET RIVER.

September 27th.—Present: 10 members.

WATER CONSERVATION.—Under this title Mr. A. W. Miller read a paper in which he said that with the idea of conserving water a convenient site for a dam should be chosen, but one not too close to the stables. The dam should be deep and narrow, and covered to prevent evaporation. It should be fenced in, and the water should be pumped into troughs by means of a windmill or other power, as the stock made the water dirty if they had free access to it. A small tank should be placed in front of the large dam, as that would keep dirt and rubbish from going into it. It was well to provide for at least two years' supply of water.

HARTLEY (Average annual rainfall, 15in. to 16in.).

September 26th.—Present: 13 members and one visitor.

The Farmer's Herd of Cows.—In a short paper dealing with this subject Mr. J. M. Hudd said a noticeable fact on many farms was the number of cows whose yield of butter was considerably below 200lbs. per annum. To lay the foundation of a good milking strain of cattle one should pay particular attention to the pedigree of the sire that was to be used, to see that his ancestors were stock with good records. It was very important that every farmer should test his cows, and any information regarding the testing of the milk could be obtained from the Government Dairy Expert. After discussing that paper the report of the delegates to Congress was received and discussed.

LENSWOOD AND FOREST RANGE (Average annual rainfall, 35in. to 36in.).

September 27th.—Present: 12 members and one visitor.

The Need for Experiments for the Production of Regular Crops of Apples.—Under this title a paper was contributed by Mr. F. Green, who suggested that the Branch should undertake systematic experiments with the object of determining whether it was practicable to secure a regular moderate crop of fruit, in place of the irregular cropping that resulted in a glut one year and a superabundance in the year following. As to the lines on which experiments should be made, he offered the following suggestions. First, the judicious thinning of fruit spurs to such a degree as to prevent the exhaustion of the tree through overblooming and overcropping. Second, artificial manuring to be continued yearly for a definite number of years. Third, a system of cultivation having for its object the retention of the maximum amount of moisture in the soil. Fourth, the cutting out in summer time of all surplus young growth not required for the development of the tree or for the production of fruit. Fifth, the cutting or shortening back of fruit spurs to a blank stem at a period to be determined, in order to bring the development of new buds to the fruiting stage in the slack season. "In regard to the first," he said, "much energy can be conserved to the tree by thinning, which at present is waste effort, and which must be detrimental to the fruiting of the following season. The application of artificial manures helps to restore the energy lost as the result of the maturing of a crop of fruit. Much can be done by cultivation. We seem to think that if we plough our orchard and harrow to a fine tilth in spring that this is all the cultivation an orchard needs. My firm belief is that after every summer rain the soil should be lightly harrowed to break the crust formed by the beating of the rain on the soil. Very often neglect to do this is responsible for the fact that our land gets so dry so soon after rain, when by very little trouble we could conserve the moisture in the soil, not only assisting in developing the fruit, but aiding the tree to develop fruit buds for the coming season. I believe we should relieve the tree in early summer of all rank growths that are not required, as by so doing we are diverting the energy into the buds that remain on the tree. At the same time, if possible, all deformed, scabby, or small fruit should be removed. I have noticed when pruning that if I cut a spur that has grown too long back to the little ring of shortened internodes, not far removed from the main arm or limb, it will soon send out several small buds from these rings. It occurred to me that if we could determine the time it takes from the time of cutting to the development of the buds to the fruiting stage, we could so arrange our pruning as to shorten a number of spurs to bring them to fruition in the slack year." A committee, consisting of the President, Vice-President, and Hon. Secretary, was appointed to carry out the experiments suggested in the paper.

LONGWOOD (Average annual rainfall, 37in. to 38in.).

September 29th.—Present: nine members.

Homestead Meeting.—The monthly meeting of the Branch was held at Mr. E. W. Beythien's residence, when members took the opportunity of inspecting Mr.

Beythien's extensive plant for rearing poultry. In the various chicken brooders there were about 3,000 chickens. The different hatches were kept apart until about four months old, when they were put together, the roosters of course being kept separate from the pullets. Hatching was usually finished by the end of September, or at latest the first week in October. Mr. Beythien explained that the early-hatched pullets began to lay at from four and a half to five months; later settings would probably take eight months. He was not in favor of using a hopper when feeding dry mash. That class of food should be quite pure, but two-fifths of green feed could be added when using wet mash. Mr. E. Naughton (Secretary South Australian Fruitgrowers and Market Gardeners' Association, gave an address on "Seed Selection," in which he advised members to save their own seeds. With regard to onions, the largest bulbs should be selected, preferably those with the most skins. Seeds should be gathered when the pods were sufficiently open to expose the seed, and then put in bags to dry. About 80 per cent. of seed of the Globe type would germinate. On no account should seeds five years' old be sown. New or one year old carrot seed would be found to give best results. Peas grown from locally-produced seed did not yield as well as the imported article, but good results could be obtained from New Zealand seed if sown for one season. When planting seed potatoes it was well to see they were free from diseases, but it did not necessarily follow that such seed would produce a diseased crop. While imported seed was generally recommended, it did not follow that it would produce the best results. It was not advisable to plant seed from a stunted crop. Small seed from a good crop would give satisfactory returns, but care should be taken not to plant culls. The great advantage of small seed was that each set had a crown eye, with all the vitality of the potato to assist it. Cut seed was not so liable to rot if planted with the cut side upwards, He thought all seed should be pickled in a solution of formalin before planting. Cut seed should not be planted on a very hot day. The largest and best cabbages should be selected, preferably those with a deep heart and plenty of leaves; the seed would keep for 12 years, although germination would be somewhat impaired after five years.

MILANG.

September 8th.—Present: 42 members.

Construction of Shearing Sheds and Sheep Yards.—In the course of a paper on this question, Mr. J. J. Finklater said that as shearing only took about one week on many farms it was not a wise plan to go to the expense of erecting a shearing shed. He thought the machinery shed could be utilized for the purposes of shearing operations. At one corner of the shed it was necessary to have a yard about 24ft. long by 2ft. wide, large enough to hold at least 80 woolly sheep. The floor of the yard should be covered with grating. In constructing the grating for the floor it was a good plan to make it in sections so that it could be easily laid down when wanted and removed when finished with. A handy size for each section was 7ft. long by 4ft. wide, with battens half an inch apart nailed to three pieces of 4in. x 3in. stringy bark. The sections when evenly laid down, could be held in position by posts, which should be erected to hold the temporary fence around the yard. The fence need only consist of the ordinary sheep hurdles tied to the posts. Adjoining that should be the compartment where the actual work of shearing took place, that should measure 12ft. by 10ft., and be closed in all around to prevent any draught from reaching the shearers. The wall should consist of ½in. flooring board, about 8ft. in height. That would need to be constructed on three sides, the fourth side being the wall of the shed. The floor should be made of ½in. flooring board. It would be impossible to remove that part at the end of the shearing, but it could be made use of for many different purposes throughout the year. On one side of the shearing compartment should be a small catching pen, which should be large enough to hold from 20 to 30 sheep. After each sheep was shorn it should be let out through an opening in the wall 30in. high by 18in. wide to a small pen on the outside measuring 6ft. square. The shearing floor should be large enough to accommodate two shearers, so there would be two openings in the wall and two pens outside. After two pens had been filled with shorn sheep the animals could be branded, counted, and let out. The wool-sorting compartment should be on the other side, and that should also have a board floor and be about 15ft. long by 12ft. in width, that would give plenty of room for the wool roller to work around the table after the fleece was thrown on it. The table should be about 3ft. 6in. in height, 6ft. in length, and 4ft. in width. The top of the table could be made from ordinary broom handles, placed about 1in. apart. A suitable site should be chosen for the construction of sheep yards, preferably on a piece of rising ground. The length of the yard should be about 120ft. long by 50ft. in width. Inside of that enclosure one should have six smaller pens. The first pen should be about 50ft. square, and would accommodate about 400 sheep. The next pen should be triangular in shape, having for its two sides the fences, forming the wings, which should lead from the outer fence on either side to the mouth of the race in the centre. The gate leading from the receiving yard to the force pen should be in the centre of the fence dividing them. The race should be about 9ft. long and 2ft. wide, and not less than 3ft. high. Another fence should run almost to the outlet of the race, just leaving enough room to hang a gate on to the last post. That fence would divide the bottom end of the yard. Another fence run from about 3ft. behind the outlet of the race to the outside fence on either side would give four check pens, measuring about 40ft. by 25ft.; 3in. x 1in. stringy bark in lengths of 20ft., nailed to posts about 6ft. apart, using five laths to the panel would make good substantial fences. If it were given a coating of tar at least once a year much would be done to prolong the life of the fence.

MILANG.

October 13th.—Present 41 members.

Clearing and Cultivation of Mallee Lands.—Papers dealing with this question were contributed by Messrs. P. Bagley and W. McMillan. Both speakers advocated either cutting or rolling scrub during the early winter months, to encourage a vigorous growth of shoots, which, if burnt during the month of February, the following year, would have a very beneficial effect on the early extermination of all stumps, &c., provided one kept at work on the land taken in hand. Wheat was given preference as the first suitable crop to sow, and if possible all stubble should be burnt either with a firerake or some other means. The land could then be fallowed during the following season, and sown with Algerian oats to combat take-all. The heavy stubble of the oats would ensure a good burn, provided a suitable day was chosen. Fallowing should again be carried out the next season, and the land sown with wheat. Both writers considered that farmers should only take in hand as much land as could be successfully managed, and as soon as possible go in for sheep on the farm.

MOUNT BARKER (Average annual rainfall, 30.93in.).

August 29th.—Present: 45 members and two visitors.

Selection and Development of a Stud Dairy Herd.—In the course of a paper on this subject, Mr. L. Cowan said no breeder of livestock could hope to build up a good herd of cattle, who year after year sold his best stock. In selecting the cows for the herd it was necessary that one should first of all choose a dairy cow. She should have a good constitution, capacity, and such a temperament that daily throughout a long period of years she would work to one end, namely, that of profitably converting her feed into milk and butter fat. Although it was important to secure good cows in selecting the herd, it was essential that the best sire possible should be chosen to maintain the character of the herd, and for that reason one should have a knowledge of the sire's pedigree. Great attention should be paid to the development of the herd and their offspring. The animal should have good feed, care, and management from calfhood to maturity. Six weeks or two months prior to coming in the cow should be dried off and put into a good grass paddock, or failing that she should have plenty of succulent foods, such as silage, mangolds, and those rich in protein, yet being easily digestible, good hay, bran, crushed oats, or oil meal. About 10 days before calving the ration should be gradually reduced until within two days of freshening, when bran mashes should be substituted. As a result of good feeding the calves would always be strong and vigorous. A good rule was to take the calf from the mother within 24 hours of its birth, and allow it to have its mother's milk for two or three weeks, after which skim or separated milk could be given; and at four weeks old a little solid food such as good clean hay, bran, &c. The pails and feed boxes should be kept clean, and the stalls well ventilated and warm in winter. The following points should be kept in mind—only cows of a good type and constitution should be chosen. Only use the services of

the best sire procurable, and breed from the best cows. Feed the cows well right to time of calving. Keep the calves growing and in a healthy condition. Make all cows work to their fullest capacity by judicious feeding.

PORT ELLIOT (Average annual rainfall, 20.33in.).

August 18th—Present: seven members.

Care of Horses' Shoulders.—In a short paper dealing with this subject Mr. A. Evans said that when breaking in a young horse great care should be taken to prevent sores from forming on the shoulders. The lining of the collar should be kept clean, and the shoulders washed each day with clean cold water. Boils on horses' shoulders were in most cases caused by injudicious feeding with grain. If the quantity could not be moderated Epsom salts should be put in the feed to prevent the overheating of the blood. A good ointment for healing the sores could be made from fine powdered black lead mixed with fresh dripping, olive oil, or veterinary vaseline. After applying the ointment to the sores a leather lining or pad should be placed between the shoulder and the collar so that the friction would be on the lining and not on the shoulder.

At a meeting held on September 22nd Mr. J. F. Vince gave an address on "Soils and Manures for Fruit Trees." He preferred the use of bonedust to chemical manures, as that was not so likely to impoverish the soil. Mr. W. E. Hargreaves also read a paper on "Repatriation," and gave a report of the Congress recently held in Adelaide.

KANMANTOO, September 29th.—The Hon. Secretary (Mr. C. J. Downing) read an extract from the local paper on "The Sugar Gum and Its Value as a Forest Tree," and the chairman (Mr. H. R. Shepherd) reported on the work of the recent Annual Congress.

MACGILLIVRAY, September 25th.—Mr. Inglis reported on the 1917 Congress, and a portion of the paper by Mr. W. J. Colebatch on "The General Management and Breeding of Pigs," was read by Mr. Wiadrowski.

MORPHETT VALE, September 29th.—The meeting took the form of a "Free Parliament," when various questions of local interest were asked and discussed. Mr. E. Perry stated that he had sprinkled sulphur amongst his bags of wheat with the result that very little damage had been done by mice. A stack of hay had also been satisfactorily treated in a similar manner.

STRATHALBYN, September 25th.—The report of the delegates to the annual Congress was received, and a discussion on the proceedings took place. Mr. Cuming also gave a report on the visit to Roseworthy College.

SOUTH-EAST DISTRICT.

GLENCOE (Average annual rainfall, 33.84in.).

August 30th.—Present: 11 members.

Pig-raising on the Farm.—Mr. F. L. Koop, in reading a paper on this subject, said that as dairying was carried on in that district pigs should be kept as a profitable sideline on the farm. He favored the Tamworth-Berkshire sow mated with a Berkshire boar to produce a good class of pig. The sows should have a small paddock to graze in until a week before farrowing, when they should be kept in a pen 8ft. or 9ft. square. The sty should have a wooden floor, as stone or cement was too cold for pigs. When three or four weeks old the suckers would begin to feed themselves, and at five weeks old the boar pigs should be castrated. At seven weeks the young pigs could be weaned, and in three to five days' time the sow would be ready to mate again with the boar. When the pigs were taken from the mother they should be fed on pollard and skim milk with boiled potatoes. Oats and boiled potatoes were suitable food for growing pigs, and the oats could be fed dry. When five months old they could be put up and fed on good fattening foods, such as malting barley, crushed corn, and skim milk. Before being shut up to fatten the pigs should be well grown, otherwise if fed on heavy foods they would put on fat, but would not develop in size. It was not wise to give barley to a sow rearing a litter. Charcoal and ashes should also be fed to the pigs, and their sties kept warm and dry.

KONGORONG.

September 25th.—Present: 10 members and four visitors.

Shoeing Horses.—In a short paper dealing with this question, Mr. A. C. Gust said every farmer should have a set of shoeing tools. Considerable time and expense would be saved if that plan were adopted. With little practice one would soon learn how to fix on the shoes. Mr. S. Dixon also read a newspaper extract on "Scours in Calves," and the report of the Congress delegate was discussed.

KYBYBOLITE (Average annual rainfall, 22in.).

September 27th.

Farmers and Experimental Farms.—In a paper on this subject Mr. G. A. Hahn said he did not think the average farmer took enough interest in the various experiments conducted on the Government farms. The farms were established and maintained by the Government with competent men in charge. The experiments on the farms were conducted for the benefit of the farmer, and enabled him to see what class of wheats and fertilizers were particularly suited to the district. Following on a suggestion made by the speaker in his paper, the Manager of the Government Experimental Farm at Kybybolite (Mr. L. S. Davie) assured members of the Bureau that more frequent visits to the farm would be welcomed, and that he would be also willing, at all times, to give farmers any information that was asked for so far as lay in his power.

MUNDALLA.

September 26th.—Present: nine members.

Sheep-dipping.—Mr. F. Wiese, in a paper dealing with this subject said the bath should be constructed of either mason work, concrete, or slabs, and be at least 30ft. long and 6ft. deep, 2ft. wide, at the top and 1ft. at the bottom, with a sloping end to enable the sheep to walk out to the draining pens, of which there should be two, each capable of holding about 50 sheep. The bath should be filled with soft water to within a few inches of the top, and the water measured at every 100galls. when being put in. By marking a stick it would then be known how much was in the dip, and how much the sheep took out. In mixing the dip it was best to follow closely the directions given by the maker. Should the sheep be infested with tick, lice, or other vermin he advised mixing to the full strength, but if they were clean it would be safe to make it slightly weaker. Only the best poisonous powder dip should be used, but he thought it was a good plan to use a gallon of liquid dip to about 1,000galls. of the wash, as that helped to keep the powder in suspension. About a month after the sheep were shorn was a good time to dip. The sheep should be yarded overnight, and the dipping commenced early the next morning. By doing that they would have time to dry before night. Dipping should be avoided in the middle of a hot day, because the sheep were likely to blister.

TANTANOOLA.

October 6th.—Present: 22 members.

Machinery and Harvesting.—Under this heading a paper was contributed by Mr. F. J. Bateman, who said that it was important to see that each machine was well oiled, and that all bearings were running true. All cogs should work square to one another, and should not be too deeply toothed. Should the spindle or shaft become worn, and allow the cogs to wobble it could be stopped by packing the bearings with pigskin, which would give a considerable amount of wear. If the beaters of the harvester were not cutting the straw off cleanly the breast of the comb could be packed with a damp piece of cardboard or a soft piece of leather. Hay for long fodder should be cut on the green side and stooked; 20 or 30 sheaves to the stook. If the hay were to be used for chaff fodder it should be left until the grain was large and milky. He also dealt with the methods of harvesting and threshing barley and oats.

LUCINDALE, October 20th.—Mr. P. W. Dow addressed the meeting on the "Bulk Handling of Wheat," and took as the basis of his remarks the report of Messrs. Metcalf & Company. The speaker also gave an account of the proceedings of the Annual Congress.

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Naturally **CAN** and **DO** put better quality into their shares than any other maker. They take the ground until worn right back to the socket, and are specially chilled to suit all classes of land.

Worth More **Cost Less.**

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POULTRY BREEDERS.

On application (personal or by letter) to the Poultry Expert, Adelaide, Advice on Feeding, Breeding, Housing, and Diseases, &c., will be given.

Arrangements made for Lectures in Country Districts, and Visits of Inspection paid to Poultry Yards and Farms.

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Monthly Notes in *The Journal of Agriculture;* subscription 1s. per annum, posted; 2s. 6d. Inter-State.

GOVERNMENT POULTRY STATION—PARAFIELD.

Inspection is invited of Stock and Methods Adopted.

PUBLIC VISITING DAYS—1st Wednesday and 4th Saturday in each Month.

EGGS AND POULTRY FOR LOCAL MARKET AND FOR EXPORT.

Instruction as to Age, Weight, and Methods of Fattening Poultry for the English and Local Markets.

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CROWN LANDS.

LANDS OPEN FOR APPLICATION.

Till 4 p.m. Tuesday, November 27th, 1917.

MISCELLANEOUS LEASE.

Blocks in the hundreds of Baroota, Boolcunda, Coglin, Davenport, Nilpena, Oratunga, Wonoka, Wyacca, Eurelia, Hawker, county Lytton, county Musgrave, Taylor and Grindal Islands.

Full particulars are published in the *Government Gazette*, and may be obtained, with plans, on application to the Secretary for Lands, Adelaide.

AUCTION SALE.

At the Land Office, Adelaide, Thursday, December 6th, 1917, at 11 o'clock a.m.

Allotments in towns of Augusta Park, Augusta Park Extension, Loudon Extension, Maggea, Mercunda, Muljarra, Port Augusta East, Rendelsham, Veitch, Whyalla.

APPLICATIONS FOR LAND.

Intending applicants for any lands which are open are reminded that application may be made for the whole or any portion of a block. The Land Board has power to allot portion of a block, if considered advisable, and to adjust the purchase-money or rent. If only portion of a block is applied for, deposit of a proportionate amount must be made, and the successful applicant would be required to pay cost of survey.

ALLOTMENTS, SALES, TRANSFERS, SUBLEASES, AND MORTGAGES.

Notice is hereby given that in future no applications for land, or for transfer, sublease, or mortgage of Crown leases or agreements will be approved to unnaturalised persons of *any* nationality, or to naturalised persons of enemy origin unless the consent of the Honorable the Attorney-General of the Commonwealth be first obtained by the parties making the application.

Where any doubt as to nationality exists, it will be necessary for certificate of birth or naturalisation papers to be exhibited.

The same principle will apply to land sold by auction.

OFFICIAL LIST OF LANDS OPEN.

The attention of intending applicants for land is directed to the Official List of Lands Open, which may be seen at the principal Post Offices, and copies obtained at the Office of the Secretary for Lands. The List shows the Areas, Localities, Prices, &c., of the Sections available and the conditions under which they may be applied for.

NOTICE TO APPLICANTS FOR LAND.

The Land Board meets daily (when necessary) at the Board's Office, Department of Lands, to deal with applications received the previous day for any lands that may be open in the Official List. Applicants must either attend personally or send a full written statement. Forms can be obtained at Post Offices, or on application to the Secretary for Lands.

HARRY JACKSON,

Commissioner of Crown Lands and Immigration.

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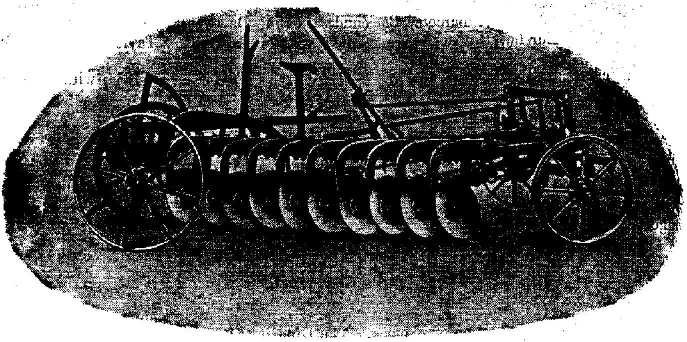
STUMP-JUMP IMPLEMENTS

PARRAKIE DISC FIELD TRIAL.

Eight competing. Result—Shearer's First.



Patented 10 one-way Disc Cultivating Plough, with Bridle Draught

Made in sizes from 4 to 12 Discs, with Bridle Draughts.

Shearer's Patent Seed and Fertilizer Drill.

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Write for Catalogue and Price Lists.

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WALTER J. COLEBATCH, B.Sc. (Agric.), M.R.C.V.S.,
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Agriculture, Veterinary Science, Dairying, Aviculture.

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Chemistry, Mathematics, Botany, English, Book-keeping.

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Manual Practice on Farm, Vineyard, Orchard, and in Dairy Wine Cellars, and Farm Workshop.

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£30 per annum (including board and lodging) and £1 for medical fees, payable *pro râta* at the beginning of each session.

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Six, each valued at £90, open for competition annually.

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The course of study extends over nine sessions, or three years.

The First Session of each year begins on or about the third Wednesday in April and closes on or about the third Friday in July.

The Second Session opens on or about the second Tuesday after the close of the first session and closes on or about the second Friday in October.

The Third Session opens on or about the second Tuesday after the close of the second session, and closes at the completion of the vintage.

Applications for Prospectus and information should be addressed to—

The Secretary,
Agricultural College,
Roseworthy.

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ARE YOU?

If not, join a Branch at once. If the nearest Branch is not within reasonable distance of your Home, write to the Department of Agriculture for particulars as to how to form a Branch.

It is to your interest to do so.

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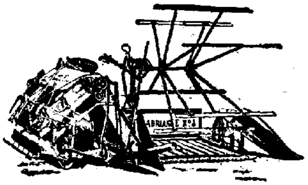

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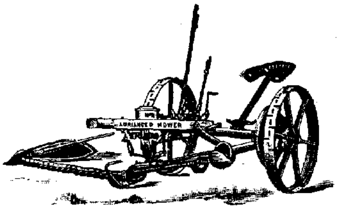
HARVESTING MACHINERY of various kinds is used in every crop-bearing country in the world. Large numbers are now in use in South Australia, and Users recognise that such Machines are adapted for Australian conditions and give long years of service with a minimum of trouble and renewal of Parts.



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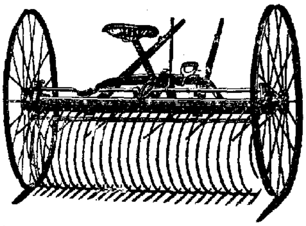
MAY'S LATEST IMPROVED COMPLETE HARVESTERS

We advise all Buyers to book up right away. We have large numbers of machines reserved for the coming harvest, both in harvesters and strippers. Reports show that MAY'S HARVESTERS did splendid work last harvest, and successfully handled STORM-SWEPT CROPS LYING TANGLED, TWISTED, AND ROTTING ON THE GROUND.



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Sizes: To take 5ft. 2in., 6ft., 7ft., 8ft., and 10ft. 6in. of crop.

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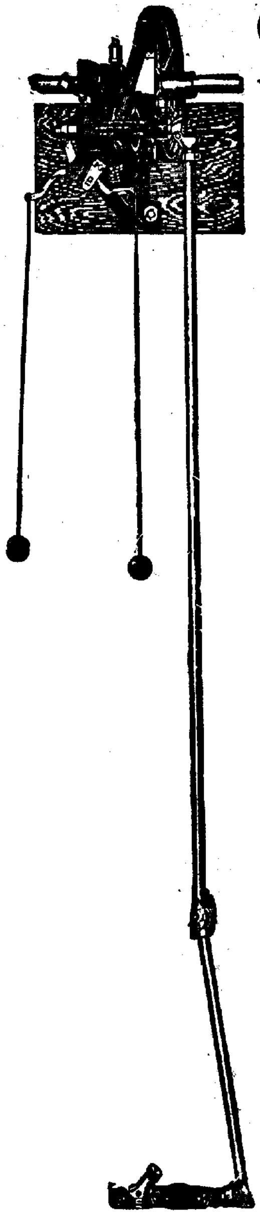

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The Machines are Guaranteed to be silent, smooth running, and efficient. There is no side thrust. "Cooper" Handpieces, Combs, and Cutters fit other make machines.

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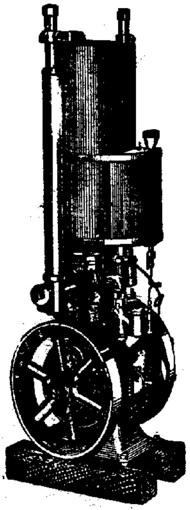
"Cooper" Little Wonder 2 H.P. Engine.



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Will stand long years of service.

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